

MACWORLD

THE REPORT ON THE MAGAZINE

June 1992 \$3.95 Canada \$4.95

Accelerators

PRESERVING YOUR INVESTMENT

MIW LAB 28 Products Tested

Integrated Software

MICROSOFT vs. 5 OTHERS
WHICH ONE IS BEST?

Input Alternatives

28 PRODUCTS TO EASE
YOUR WORK

Imaging Software

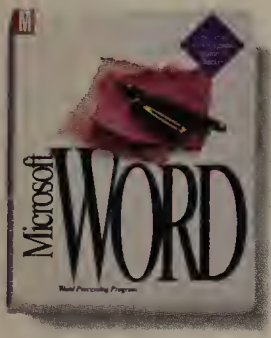
10 RENDERING PROGRAMS
COMPARED



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MAC® USERS, LIKE GUNNAR, TODD AND CHARLYN.
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Contents

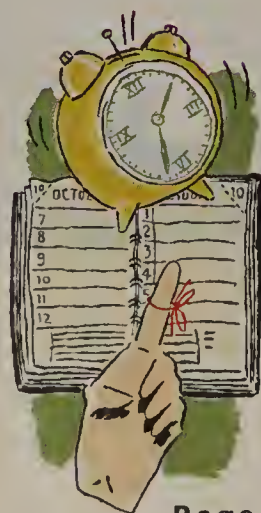
MACWORLD THE MACINTOSH® MAGAZINE JUNE 1992

FEATURES



On the Cover

YOUR MAC JUST
ISN'T AS FAST AS IT
USED TO BE.
BUT BEFORE YOU
OPT FOR A TRADE-IN,
CHECK OUT OUR
COMPREHENSIVE
REVIEW OF THE LATEST
030 AND 040
ACCELERATORS, PAGE
146. (ILLUSTRATION BY
RON CHAN.)



Page 129



The Need for Speed 146

BY MATTHEW LEEDS How do you get a faster Mac without buying a new one? Get an accelerator board. We tested 28 accelerators for a wide range of Macs—from the Classic to the Quadra 700—to help you decide whether to replace or accelerate.

Input Alternatives 154

BY FRANKLIN N. TESSLER Are you looking for an alternative to the mouse that came with your Mac? We tested a variety of input devices to find the best in innovation and ergonomics.

All-in-One Programs 160

BY TOM NEGRINO Integrated software packs a lot of functions in a low-cost package. We compared 6 programs to see how well each handles word processing, page layout, telecommunications, graphics, database management, and spreadsheets.



Hubs: Connecting to Ethernet 166

BY LON POOLE Thinking of upgrading your network from LocalTalk to Ethernet? Macworld Lab tested 11 10BaseT hubs to find the winners in speed and reliability.

Mathematics Analysis 172

BY CHARLES SEITER Five Mac programs offer scientists and engineers powerful computational tools they need for solving mathematical problems in research and design.

Rendering: Making Realistic 3-D Graphics ... 176

BY DAVID POOLE Choosing the right software—and hardware—to make realistic-looking 3-D images can be almost as difficult as creating the images themselves. We review 10 packages that offer widely varying photo-realistic rendering capabilities.



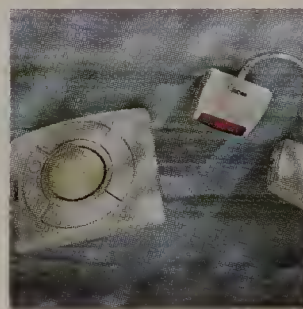
REVIEWS

- 184 **Macintosh 16" Color Display**
Color monitor
- 185 **Showplace 1.1**
Rendering program
- 188 **Gofer 2.0, On Location 2.0.1**
File-finding utilities
- 188 **MouseMan, TrackMan, A³ Mouse**
Input devices
- 190 **Muse 1.0**
Data-analysis software
- 192 **Number Munchers 1.1, Super Munchers 1.0, Word Munchers 1.0**
Educational games
- 194 **Wordscan 1.0, Wordscan Plus 1.0**
OCR programs
- 197 **Dycam Model 1, Canon RC250**
Still-video cameras
- 199 **ArchiCAD 4.02**
Architectural CAD software
- 201 **Bose RoomMate, MacSpeaker**
Shielded stereo speakers
- 202 **Nobunaga's Ambition**
Historical strategy game
- 202 **Aldus FreeHand 3.1**
Draw program
- 204 **Prograph 2.5**
Object-oriented development environment
- 204 **StudyWare for the SAT 3.7N**
SAT training program
- 206 **SICOS Cordless Rechargeable Mouse, SICOS Cordless Trackball**
Cordless input devices
- 206 **PageBrush Professional**
Gray-scale hand-held scanner
- 207 **Minitab 8.2**
Statistical software

- 207 **Pro-Cite 2.0**
Bibliographic database manager
- 208 **FolderBolt 1.02**
Folder-protection utility
- 208 **Patton Strikes Back: The Battle of the Bulge**
Historical simulation game
- 210 **Wordtris 1.0**
Arcade word game
- 210 **Expert Color Paint 1.0**
Color painting program
- 213 **Animation Clips**
Animated clip art
- 213 **Notify 1.0**
Wireless message transmitter
- 215 **WordPerfect for the Macintosh 2.1**
Word processor
- 215 **PowerPort/V.32**
9600-bps PowerBook data/fax modem
- 224 **LightningScan Pro 256**
Hand-held gray-scale scanner
- 224 **RateFinder 1.5**
Shipping-cost tables
- 225 **ComStation 2, ComStation 4**
Fax and data modem for networks
- 225 **Citadel with Shredder**
System-security tools
- 226 **The Complete Annotated Alice**
HyperCard-based book
- 226 **NetWorks 1.0.1**
Network-management and paging utility
- 227 **Creepy Castle**
Arcade-style game
- 227 **Aspects 1.01**
Collaborative software



Page 160



Page 206



Page 166



Page 131

DEPARTMENTS

- 16 **How to Contact Macworld**
- 19 **MacBulletin**
- 23 **Commentary/ Jerry Borrell**
Curling up with an electronic magazine
- 35 **Letters**
- 71 **Art Beat**
BY CATHY ABES
- 75 **The Iconoclast**
BY STEVEN LEVY
Another look at Claris
- 83 **Conspicuous Consumer**
BY DEBORAH BRANSCUM
Specialized magazines for Mac fans
- 97 **Updates**
- 105 **Lab Notes**
BY MARK HURLOW
- 121 **News**
BY DAN LITTMAN AND TOM MORAN
- 229 **The Desktop Critic**
BY DAVID POGUE
- 233 **New Products**
- 241 **How To/Quick Tips**
BY LON POOLE
- 247 **How To/Getting Started**
BY JIM HEID
Customizing word processors
- 255 **How To/Insights**
BY DAVID POGUE
Canvas 3.0
- 259 **Where to Buy**
- 332 **Best-Sellers**

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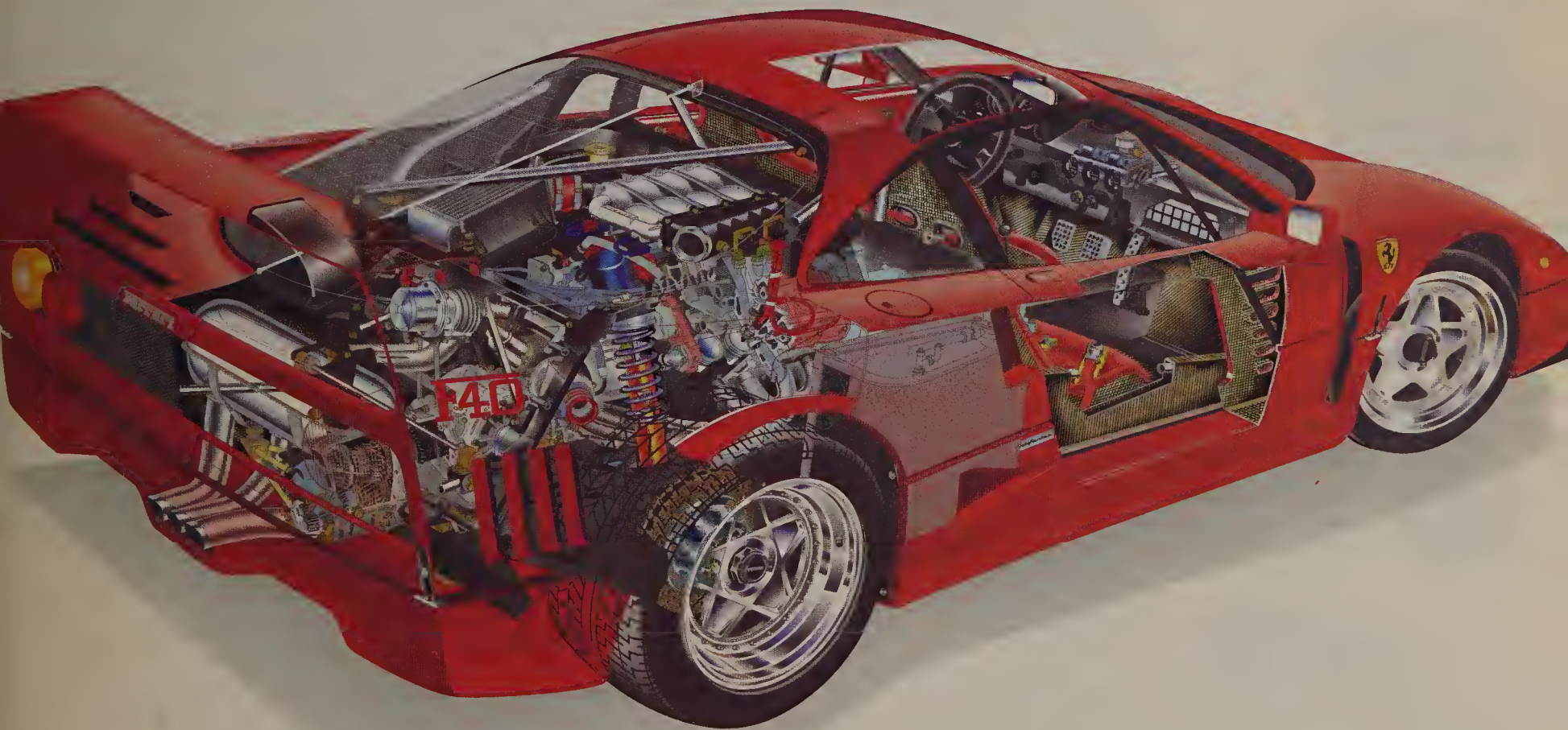
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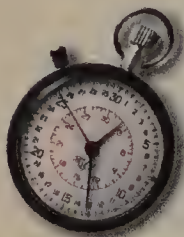
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Revolutionary 32-bit color display technology offers unprecedented performance for graphic arts applications.

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Custom ASIC QuickDraw accelerator improves by as much as 600% certain on-screen drawing functions such as scrolling and screen redraw.



GWORLD ACCELERATION

Ordinary 1 or 4 MB SIMM chips may be added to create up to 8MB of GWorld-RAM for quick handling of large images.



SMOBC

High quality solder-mask-over-bare-copper board construction (SMOBC) is the ultimate in durability and reliability.

GAMMA CORRECTION & DIRECT SET ENTRIES



Sets monitor gamma and provides multiple display default settings for QuickDraw.



The black channel is stored in this bank of V-RAM chips. RC images contain no black information.



HARDWARE PAN & ZOOM

Smooth panning and 1X, 2X, 3X...up to 16X zoom functionality provides the perfect tool for detailed image retouching.

RISC

INTERFACE FOR OPTIONAL RISC ACCELERATOR

The ImagePro daughterboard is a programmable 40MHz RISC accelerator for use with the ProColor 32. The ImagePro also provides real-time JPEG compression and decompression.

TEROPS PROCOLOR 32

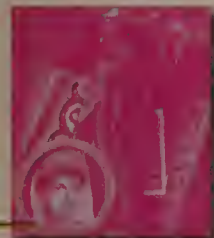
HARDWARE SOLUTION FOR CMYK-TO-RGB CONVERSION

The ProColor 32 dramatically reduces the time and memory required to convert images from CMYK to RGB format by eliminating the need for time-consuming software conversions. Images in cyan, magenta, yellow and black (CMYK), the color space used for color separations and printing, are converted to red, green and blue (RGB) for display on your monitor using VLSI chip technology. By performing the CMYK-to-RGB conversions on-board, the ProColor 32 accelerates the conversion and eliminates the need for software to store both CMYK and RGB data in system or hard-disk memory.



ADVANCED 9-BIT DAC

The 9-bit digital-to-analog converter (DAC) allows for gamma correction to be made without any on-screen color degradation.



In a CMYK image, the magenta channel is stored here. When working with an RGB image, the blue data is stored here.



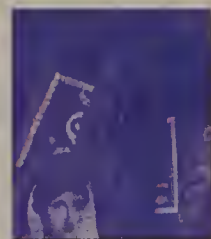
In a CMYK image, the yellow channel is stored here. When working with an RGB image, the green data is stored here.



In a CMYK image, the cyan channel is stored here. When working with an RGB image, the red data is stored here.



The custom ASIC chip instantly converts CMYK data to RGB for screen display, bypassing time-consuming software conversions.



RGB MODE

The ProColor 32 supports both RGB and CMYK modes, providing complete compatibility with existing RGB software as well as simultaneous on-screen display of both RGB and CMYK information.

MULTIPLE MONITOR SUPPORT



Variable Clock Generator provides support for monitors ranging in size from 13" to 21".

BUS MASTERING

The ProColor 32 accelerates other boards you may have in your system.

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"We left some things out of WriteNow 3.0"

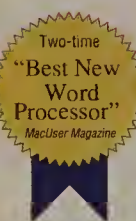
—Heidi Roizen,
CEO, T/Maker Company

And you'll be happy we did.

Why? Because our competitors, in trying to make their word processors do *absolutely everything*, have created software that is too big, too slow, and too hard to use.

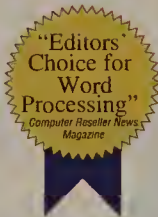
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	WriteNow 3.0	Word 5.0
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Application Size	220K	852K
Comfortable with System 7 & 2 MB	Yes	No
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Thesaurus (words)	1.4 Million	191,000
Paragraph Styles	Yes	Yes
Character Styles	Yes	No
Suggested Price	\$249	\$495

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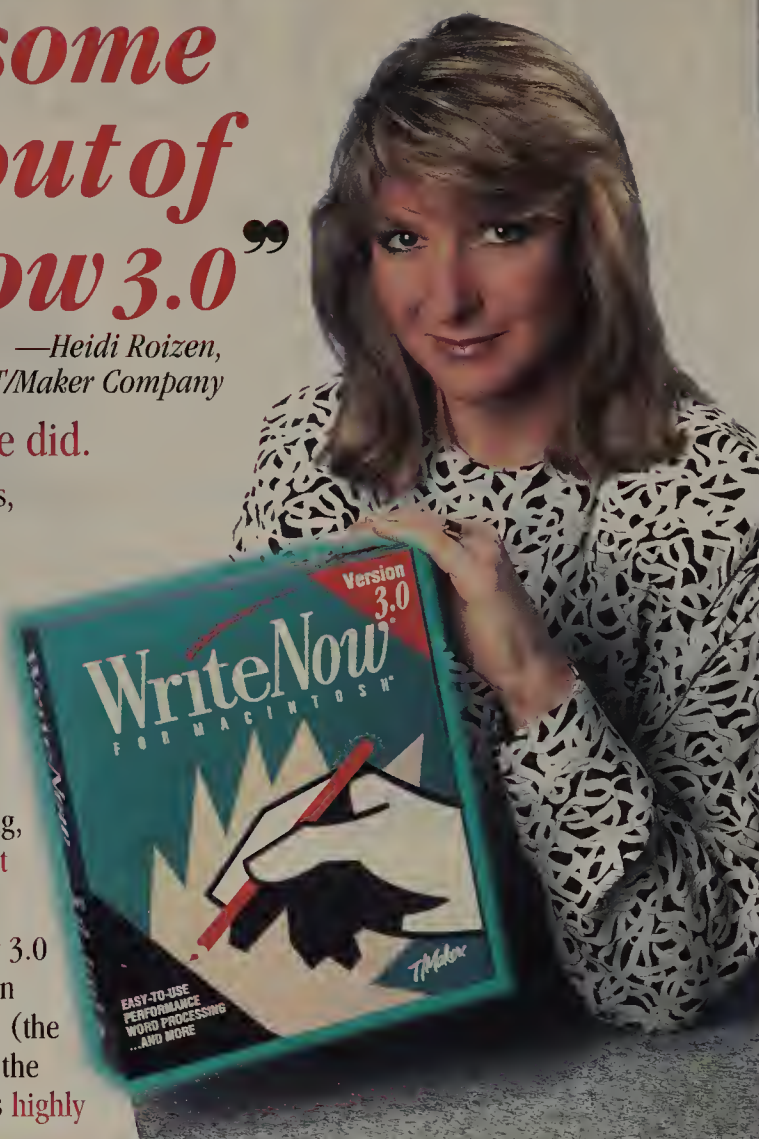
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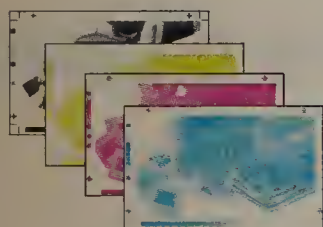
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Microtek removes the biggest barrier to owning a Slide Scanner



If price has been the barrier separating you from high quality color scanning, take a look at the ScanMaker 1850.

Another stunning price breakthrough from Microtek, the leader in affordable color scanning solutions.

The ScanMaker 1850 sports a formidable set of specs. 35 x 35mm scanning area. 24-bit color. 8-bit gray-scale. 1850 dpi resolution.

Best of all, it's so easy to use. Just drop in any slide and you're ready to start scanning.

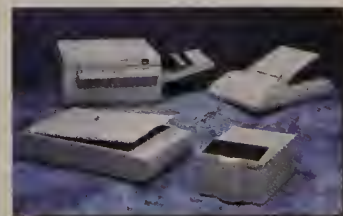
The ScanMaker 1850 gives you everything you need to go from comps to final color separations. It even comes bundled

with PhotoStyler for the PC or Adobe Photoshop for the Mac.

But wait, it looks even better when you see the price. Just \$1,999 for the ScanMaker 1850 on the PC. And only \$2,199 for the Mac compatible ScanMaker 1850S.

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Because the only barrier between you and a 35mm color scanner now is a toll-free phone call.



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15" MultiSync
3FGx Monitor
MacWorld Magazine,
March 1992

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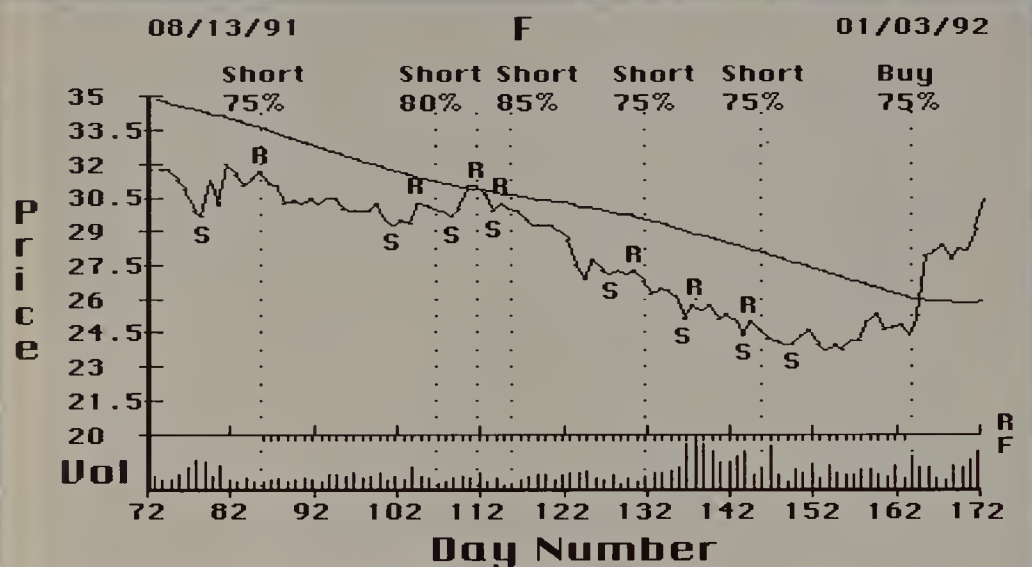
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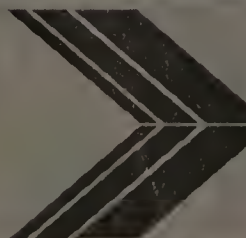
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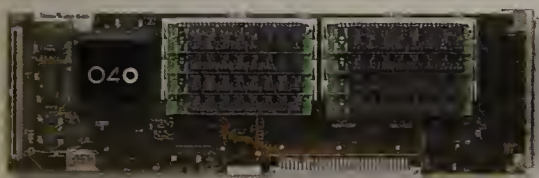
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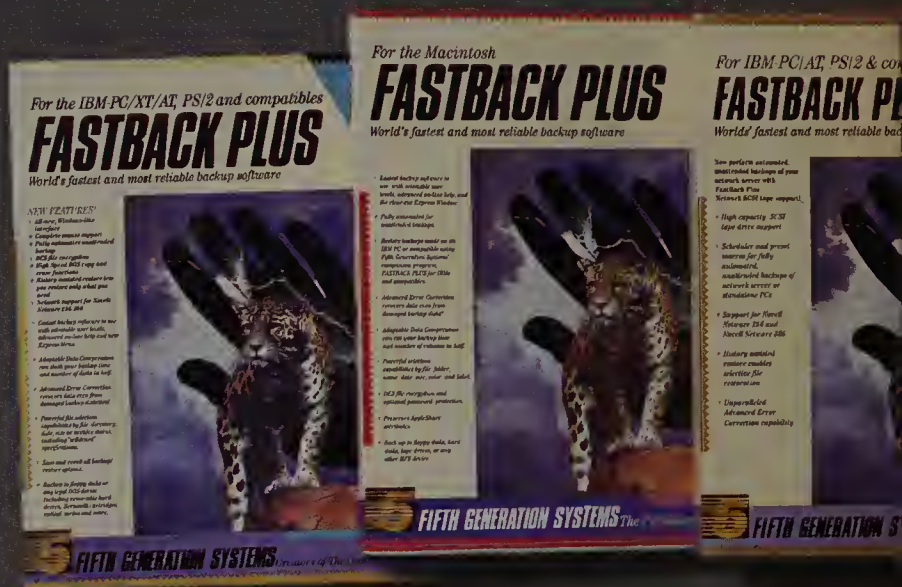


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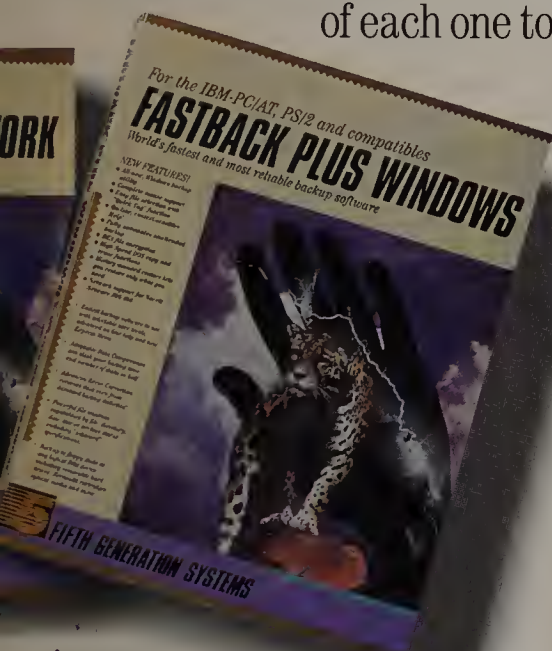
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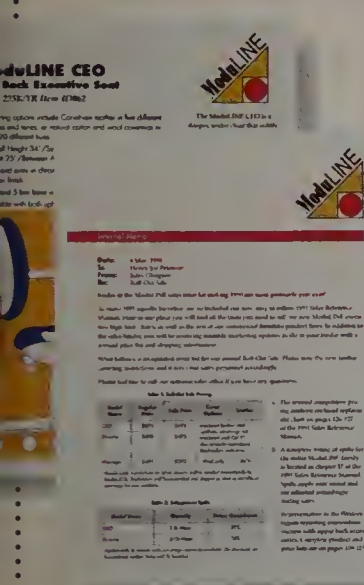
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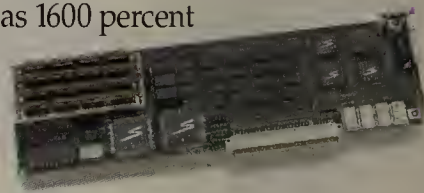
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Circle 132 on reader service card

MacBulletin

L A T E - B R E A K I N G N E W S

Fire danger has prompted Apple to offer free battery cases for spare PowerBook batteries. When the rechargeable batteries are outside the computer and unshielded, there is a small possibility of grounding causing a discharge or fire, Apple said. Call 800/377-4127.

Two Big Mergers: MacroMind Paracomp and Authorware are merging. The company's new name was not set at press time. MacroMind Paracomp (415/442-0200) will take over sales and tech support. Microsoft intends to acquire Fox Software, subject to government approval; sales and tech support will remain at Fox (419/874-0162).

Radius blasts its Rocket 68040 accelerator to 33MHz—an increase over the speed of the company's existing NuBus accelerator of about 30 percent. The Radius Rocket 33 lists for \$2499 and is shipping from Radius (408/434-1010).

Who's There? Nok Nok is a utility that tells you who is accessing your Mac under System 7's file-sharing. It can be set to open the file-sharing window when someone logs on; then it can disconnect after a specified time. Nok Nok is \$49.95 from Trik, 617/933-8810.

The ComboCache IIsi from DayStar Digital (404/967-2077) adds 32K of RAM cache, a socket for an optional math coprocessor, and two PDS slots to the IIsi. (The board fills the IIsi's PDS slot.) The \$349 ComboCache is available now.

QMS cut prices on its QMS-PS 410, QMS-PS 2210, and QMS-PS 2220 laser printers. The 4-ppm 410 went from \$2395 to \$1995, while the 2210 and 2220, both 22-ppm network print-

ers, went from \$9995 to \$8995 and from \$12,495 to \$9995, respectively. QMS is at 205/633-4300.

TrueForm Options: For owners of the orphaned Adobe TrueForm, Shana Corporation (403/463-3330) has published the \$149 Informed TrueForm Conversion Kit to move TrueForm forms into Shana's Informed format. Shana says almost all aspects of TrueForm forms are converted correctly, and a log of any problems is created.

Net Management News: The AG Group (510/937-7900) has upgraded Net Watchman to version 1.2. It supports Ex Machina's Notify pager and can monitor a class of network devices (for example, all laser printers) across an internet. Version 1.2 lists for \$295. AG Group's \$795 EtherPeek now works with all Ethernet devices based on the Sonic chip set, which includes the Quadra and most Mac IIsi and LC boards.

New Vectors: Sign-making system vendor ScanVec (508/694-9488) is entering the Macintosh market with raster-to-vector software. ScanVec's \$1495 RVC/Mac has automatic smoothing that closes all objects. The company says it arranges polygons so they can be filled when a file is imported into Illustrator or FreeHand.

Ray Dream Revs: In version 2.0 of Ray Dream Designer, the LightForge modeling module has real-time preview and supports PostScript Type 1 and TrueType fonts. The new, \$895 version's SceneBuilder assembly and rendering module incorporates DreamNet, which can divide up a rendering job for several Macs on a network. Ray Dream, 415/960-0765. **m**

Video Training Becoming Most Popular, Least Expensive Way to Learn Macintosh Programs

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You'd be surprised at the number of people who have confided in me the fact they've given up trying to learn some of the programs. They've put the box on the shelf and simply written the expenditure off as a bad investment.

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Using System 7

National Strength

With Personal Understanding

MacWeek & MacUser's 1991 Utility Product of the Year!

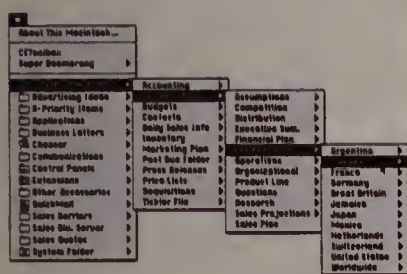


What did it take to get the editors at *MacWeek* and *MacUser* to agree on the best Macintosh utility product?

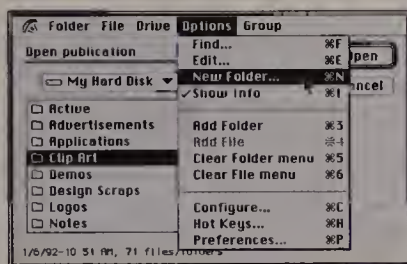
Unprecedented performance, compatibility, and value. In this case, a collection of 10 utilities that does for System 7 what products like SUM and Norton do for hard disks — only more so. As *MacUser* put it, “Now Utilities will make your Macintosh faster, easier, and more fun to use.” For example:

- **StartUp Manager™** provides complete extension management
- **Super Boomerang™** finds files and folders instantly
- **WYSIWYG Menus™** groups fonts in their own typefaces
- **NowMenus™** makes the Apple Menu hierarchical
- **AlarmsClock™** displays the time & reminders in the menubar
- **NowSave™** automatically saves files to prevent data loss
- **Screen Locker™** keeps confidential information confidential
- **MultiMaster™** launches applications and files
- **Profiler™** analyzes system configurations
- **DeskPicture™** puts color and B&W pictures on the Desktop

In fact, every utility in the collection is the best of its kind. All of the utilities in the collection are also designed, tested, and guaranteed to work together — and with anything else your customers may have...even System 6. No wonder *MacUser* gave it a perfect five mouse rating and called it “a must-have for experienced users and novices alike.”

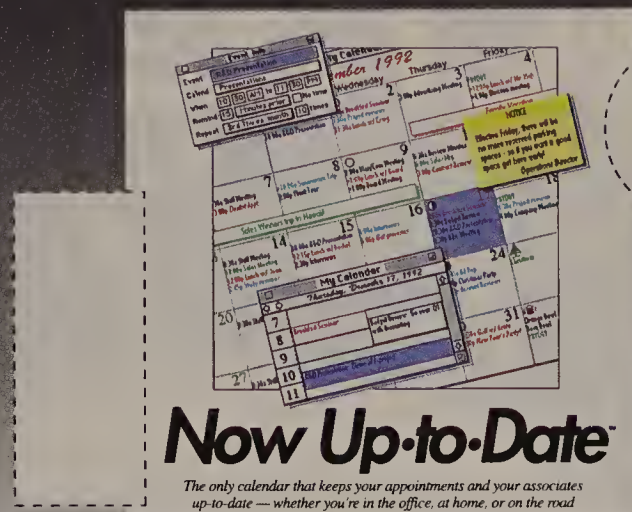


NowMenus saves you a lot of mousing around by creating submenus up to 5 levels deep for anything you put in your Apple Menu items folder — even aliases and other folders. It also pops up the menubar wherever you click your mouse



Super Boomerang lists your most frequently used files and folders in all Open and Save dialog boxes and in the Apple menu. It also lets you find files by name or content...even if they've been compressed (a file name search on a 100MB hard disk can take only 3 seconds — without requiring an index)

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What will it take to get the editors at *MacWeek* and *MacUser* to agree on the best Macintosh network product?

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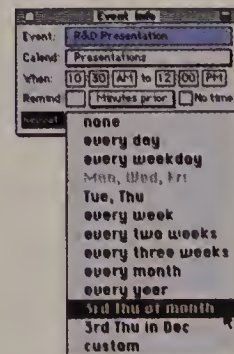
Remember Your Meetings *Now Up-to-Date* keeps track of all of your meetings and appointments, so you don't have to. It can also provide advance warning of upcoming events to ensure everyone shows up on time.

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Now Up-to-Date can repeat events (and their reminders) with whatever frequency you may desire

With all this attention from the press it's not surprising that *Now Utilities* is already one of the best-selling products on the Macintosh. *Now Up-to-Date* looks to be just as popular. Call Now at 1-800-237-3611 to learn more about both of these great products, and how they can help you get more out of your Macintosh.

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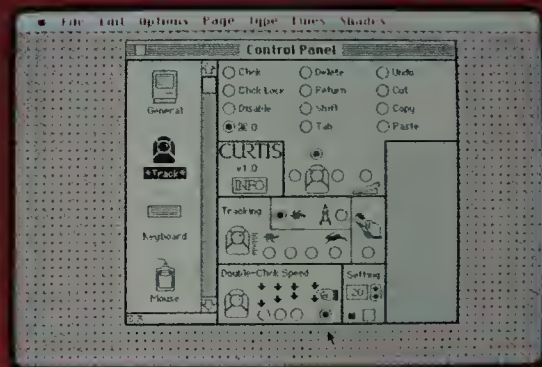
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Actual size

Electronic Magazines: Will You Read One?

BY JERRY BORRELL

W

ill you spend your evenings looking at a computer screen, reading the future's version of a magazine?

I will. Despite loving late nights reading a *New Yorker* article about the next elections in Bolivia, I'll have to get used to electronic magazines because the economics of publishing make it ever more expensive and inefficient to work with paper. The U.S. Postal Service adds to all publishers' burdens in terms of costs and speed of distribution. And paper will eventually become too expensive to waste on the millions of pages that are being printed today. Inks are improving, but there are still questions about the toxicity of ink that leaches into soil from paper in garbage dumps. And timeliness is an issue. Electronic publications can deliver information faster than paper ones can. Magazines as we know them today are becoming ever less possible, despite our love of them; cost, shrinking resources, and new technology will all contribute to their demise.

Can You Wrap a Fish in Them?

THAT WAS THE RESPONSE OF NEWSPAPER publishers a decade ago when they first began to encounter the concept of electronic delivery of information to the home. Back then electronic magazines were going to be called videotex. And the publishers had a point, even if they should have had greater aspirations for their publications than having them serve as wrapping. Their point was that you couldn't curl up on a sofa with a computer or read from one while standing on a subway train.

Developments in several technologies will change that. Flat-panel devices will be suitable for home viewing from a sofa or dining room table. And transportability is not an issue with existing true laptops, which provide sufficient display space for reading.

Electronic magazines will offer more sex appeal than paper magazines, with the

use of multiple languages, stereo sound, video, new interaction techniques, search-and-retrieval capability, and better ways of navigating massive amounts of information. Wall-size flat-panel displays for the home (with efficient controllers) should start appearing before the year 2000 and ensure that viewing electronic magazines will be both enticing and practical. Small-format CD ROM players will appear this year, making reading while traveling practical. Already the phenomenon of portable electronic books is important. The Voyager Company's version of Michael Crichton's *Jurassic Park* and other titles modified for the Mac PowerBook, called Expanded Books, are arousing much interest.

Communications Technology

SO HOW WILL YOU OBTAIN AN ELECTRONIC magazine? Certainly you'll buy them as CD ROMs. We published Macworld Interactive nearly two years ago and will publish more issues this year. But CD ROMs are, to me, a transitory distribution medium, suited for the current period. I think they will become antiquated with the introduction of better communications technologies.

After we've spent years of suffering with telephone-line-based 300-, 1200-, 2400- and 4800-bps connections to text-based online services, 9600-bps communications speeds have now become feasible. The slow improvement of modem speeds should have addressed the interminable delays experienced by online users, but every time a modem manufacturer makes another advance in technology, such as a 9600-bps modem, while dropping its prices, users demand greater performance.

Take 9600-bps service, for example. It's difficult (given the notoriously bad quality of phone connections) when an editor at one of the international *Macworld* magazines attempts to download a story from our San Francisco-based server. Downloading, or re-

trieving, 1MB-to-3MB PageMaker article files is fraught with problems like phone-line interruptions. The length of time required to download articles increases the likelihood that such problems will occur.

But ISDN and Switched Digital Services (SDS) at 64,000 and 56,000 bps, respectively, herald a new era. For the first time these high-speed services are available to users via standard telephone wires. We still have to pay a fee of around \$500 to have these lines installed. Another \$1500 worth of data communications equipment is required to connect a personal computer to them, but these prices will fall by half over the next year. And with ISDN and SDS, transmission of *Macworld's* editorial copy and images has finally become practical.

There are even more advantages to ISDN and SDS. Services are becoming available on a cost-per-use basis rather than on a lease-line basis, which drops prices to about \$20 per minute rather than close to \$2000 per month. Foreign editions working with *Macworld* are paying about \$200 per month in costs now. And connection reliability is a powerful hidden benefit. After an initial painful period of establishing a connection with ISDN, we have experienced only occasional problems with our telephone lines—typically related to a new version of software installed on the server.

Most important, however, is the fact that during 1992 ISDN and SDS are being introduced to large segments of the U.S. population. One of the primary limits on these two services has been that you've had to be physically close (within one mile) to the digital switching equipment needed to use the services. And there have been only a few switches in the United States capable of allowing end user connection. Now several of the Regional Bell Operating Companies, the "Baby Bells," are introducing ISDN/SDS-

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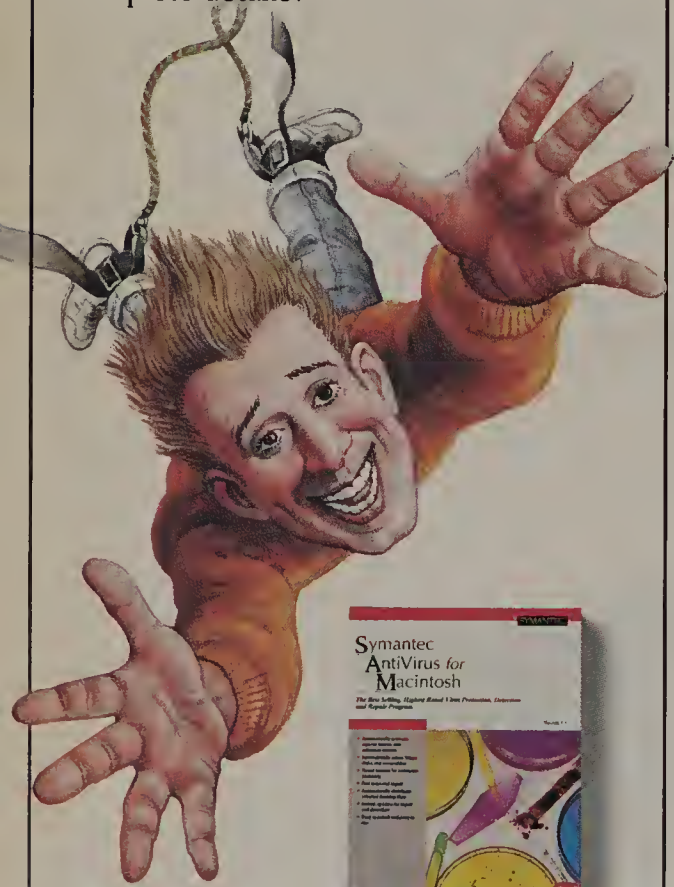
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capable switching equipment in their areas of service. That allows people to use the service from within a 9-mile radius from a digital switch. The result is that most Americans should be able to connect to such services in the near term. Most won't due to today's cost. Businesses will, and in large numbers. I believe that some ordinary mortals will connect to ISDN/SDS services this year, but only early adopters.

A near-future benefit of ISDN/SDS-type services is in their certain performance improvements. Speeds up to 128,000 bps are possible today by dedicating two pairs of phone lines to the service. Next year or in 1994, as connection equipment improves, these speeds may become possible over one line. So those of us working with the technology today can look forward to a significant performance improvement.

Defining a New Kind of Publishing

STILL, SPEED IMPROVEMENT ALONE isn't enough. Tens of thousands of our readers could connect via high-speed digital links to the central server where we store *Macworld* electronically, but not many of you would want to read our stories from PageMaker files. True, we already serve thousands of readers by placing the text of reviews, new products, and other segments of the magazine online in *Macworld* Online. But we don't serve these readers with feature articles because of the tables, graphics, and photography. Our sister publications throughout the world download our files, but they have a specialized need for the information in our stories. We need to provide readers with more than high-speed access to *Macworld* text or DTP files. Otherwise, we're disseminating a publication electronically, not offering access to an electronic magazine.

What we do today only hints tantalizingly at what we must accomplish this year to attract you to an electronic version of the magazine. For example, we will need to make available a preview version of the magazine that will allow you to quickly browse the stories and information that we can provide. Once you've looked at the latest stories, you may want to download a particular story as a compressed file to read at your leisure from your home or office computer. Or you may want to print out a copy to take with you. At current ISDN or SDS delivery rates, reading a story from a server accessed via phone lines is possible, but still a little too slow to be attractive. At 128,000 bps, you won't mind reading our stories. And when networks can deliver 1-megabit-per-second transmission speeds, you'll no

longer notice that you're online. You'll actually want to read and browse online because by then the technology and what constitutes a magazine will be dramatically different from what I'm proposing for 1992.

What About Cable?

IN FACT, AT 1-MEGABIT-PER-SECOND speeds, magazines could be provided over existing cable networks. This should strike a resonant note because most of America is wired for cable television today, so potentially we could deliver an electronic magazine in that way, or deliver it in a pay-per-view model, in the fashion of movies or special sporting events that you can already receive through cable. The real problem with existing cable is viewers' inability to interact with magazine content. Phone-based systems will allow data and instructions to be exchanged at high speed at both ends. Cable, in its present form, is a much more passive, receive-only model.

That's another part of electronic magazines of the future. Publishers will be able to lure you with high-quality content, but the real key to these new technologies is much more than simply creating wizzy files incorporating several languages and QuickTime movies. The key lies in how you'll be able to interact with, modify, store, retrieve, and select information in electronic magazines.

What Will They Look Like?

IN THE FUTURE, WILL A FEATURE be a feature? Articles will still be text and images combined on a page, but the page will have to shrink (or expand) to fit a screen. For small displays, text will have to be larger, the fonts carefully selected for legibility on a screen. Images will be active—that is, the static images that now appear in the magazine will actually be QuickTime movies that can be played. These movies will be PICT files, animations, and video.

As a reader, you should have some rudimentary control over your viewing environment—say, a choice of text size, bits per pixel (8 or 24), language, voice narration (or lack thereof), and the size of the viewing window for images, graphics, and video.

Electronic magazines will be essentially different from what you read on paper today, but not entirely dissimilar. One difference will be in the fashion that we publish stories. You'll be able to read about new products and other stories shortly after we write them, not weeks later. Another difference is in how you'll be able to search through the massive

continues

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MacUser, June '90

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COMMENTARY

number of stories that we've published. And you'll be able to cut and paste portions of our work for your own use. (And pretty soon not only the Software Publishers Association will be voicing copyright concerns—traditional publishers will join it.) Some stories will be written (or rewritten in the case of articles like hard drive reviews) more frequently or have updates appended to them.

The entire realm of how we shape information in today's magazines—and how you use information—will change. All based upon instant access to new electronic magazines via phone lines. Which brings up an interesting topic, the threat that traditional publishers feel from electronic publishing.

Antitrust Fears

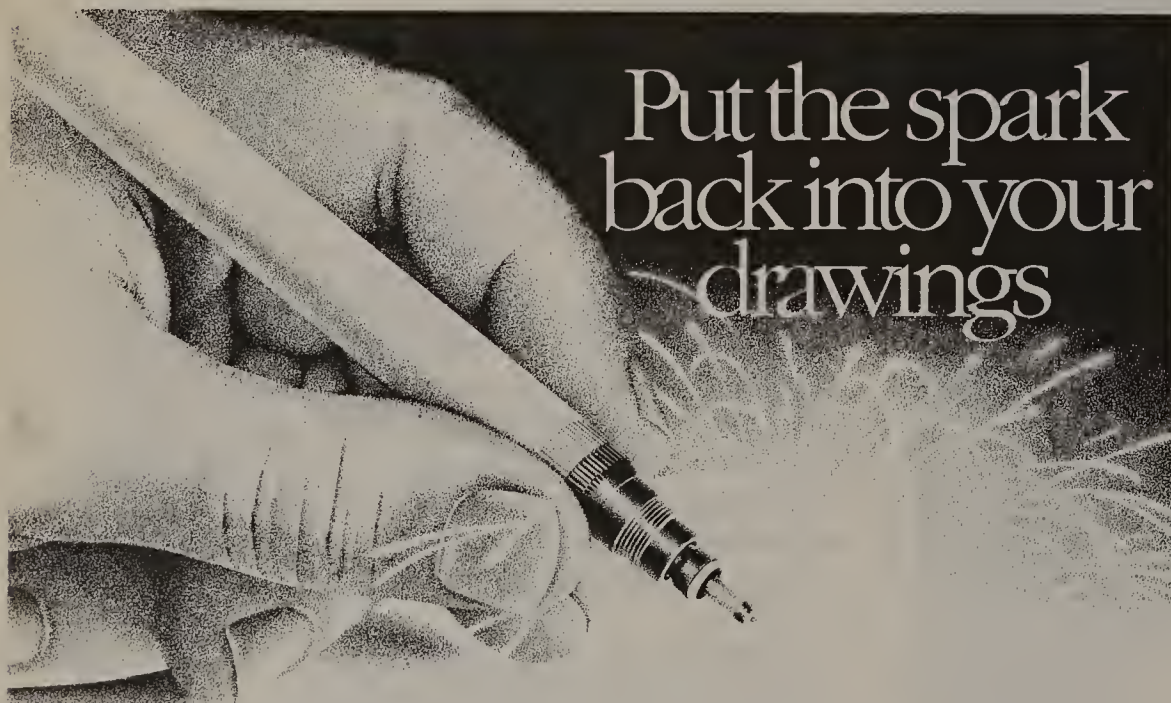
ONE OF THE RECENT CHANGES IN our society has been the regulation of public telephone networks. The federal courts decided some years ago to disallow quasipublic utilities, such as phone companies, from providing information services. In 1991, however, the courts reversed that decision and moved to allow the Bell companies and others to do just that. Shortly thereafter, newspapers, broadcasters, and other publishing companies began a noisy debate over whether the courts' decision should be countermanded through legislation. Newspaper publishers have been particularly outspoken in their criticism of the idea of allowing companies to combine phone services and information dissemination, saying that it will create a new oligarchy capable of controlling the public's access to information.

But some of us believe that the implementation of future information technologies will require that the Bell companies become participants. I happen to believe that smaller publishers will become more powerful, not less powerful, as a result of their ability to leverage resources from the phone companies' connections to every home in America. And, just as public access to cable systems is required through regulation, I believe that phone companies should be required to give all responsible parties access to phone-based information-distribution channels.

Get Ready, Get Set

SO WHAT WILL ELECTRONIC MAGAZINES look like? When will they be available? How will they improve our lives?

They'll look like Macworld Interactive, which we'll be publishing again this summer. They'll be available in 1992. And they will definitely change how we access and use information. **m**



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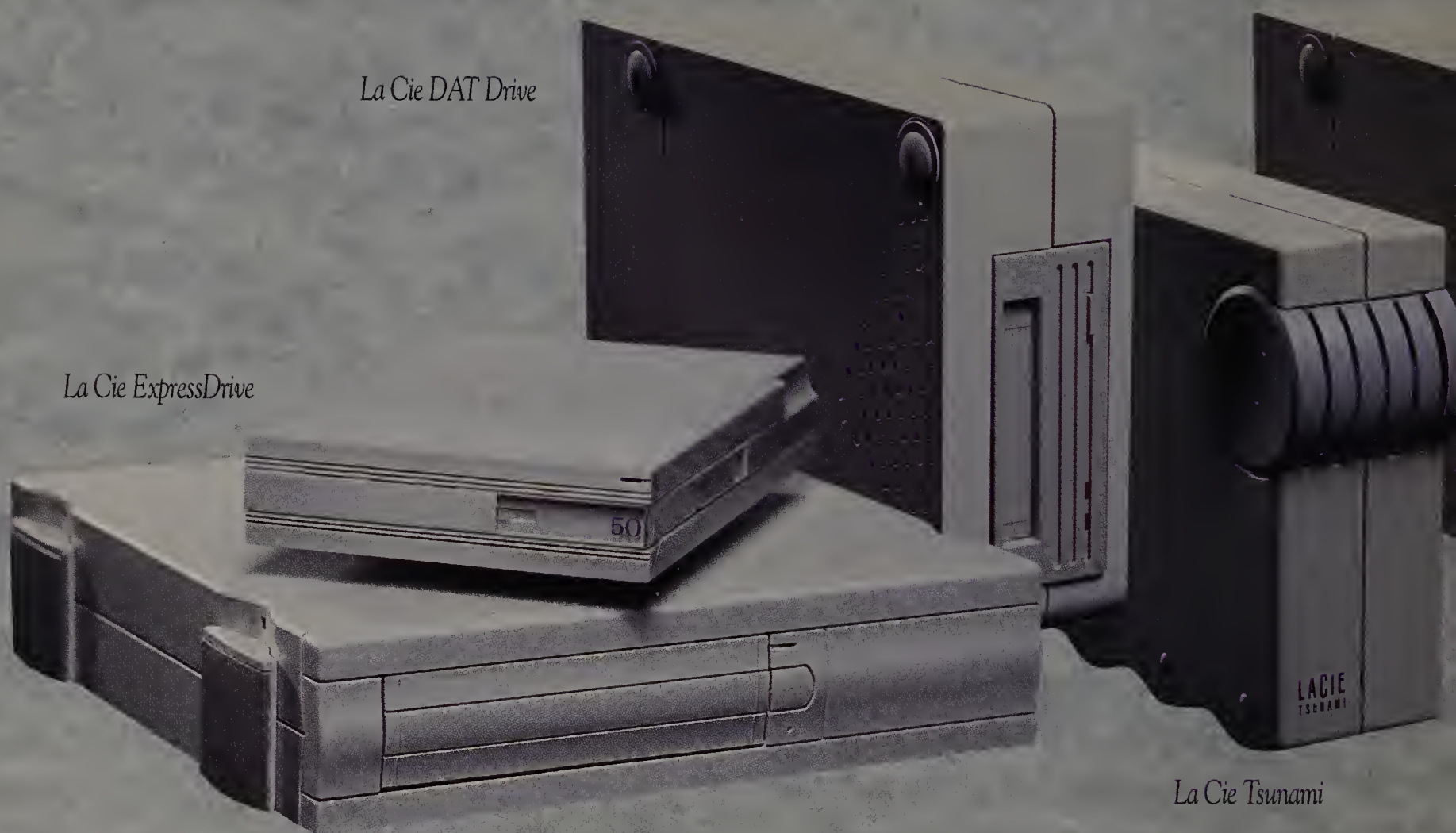
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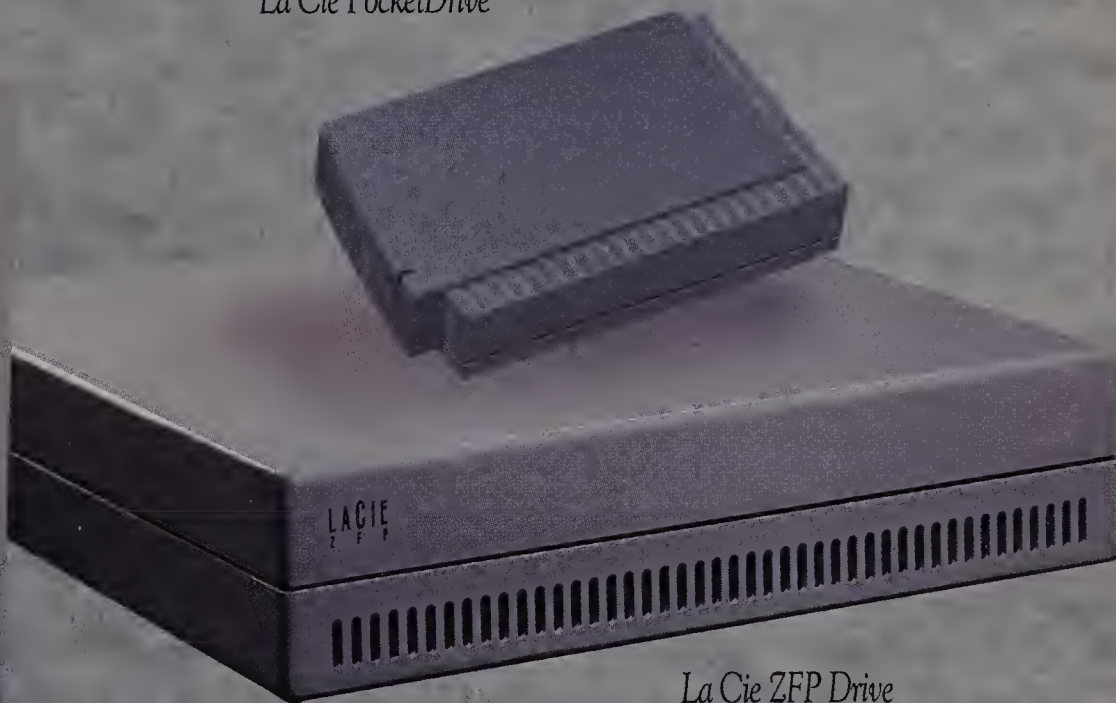
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Bobker's Dozen Best, MacUser, December, 1990

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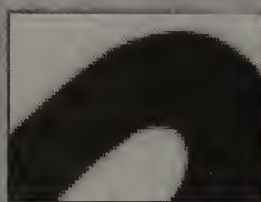
Howtek Scanmaster 3

\$8195**



La Cie Silverscanner

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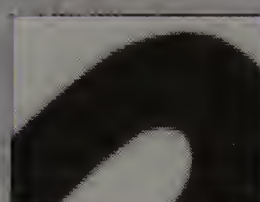
Microtek 600ZS
300 dpi at 1600%



Howtek Scanmaster 3
300 dpi at 1600%



La Cie Silverscanner
300 dpi at 1600%



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Howtek Scanmaster 3
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La Cie Silverscanner
600 dpi at 800%

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We believe quality is a priority. Our image as a company that produces quality products is well known. We're so confident in the quality of our scanner image that we are willing to compare it to other scanners right here. Compare for yourself.

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Just look at the difference in the color scans. The single-pass Silverscanner has three separate noble gas-filled lamps for red, blue and green that are balanced so you get great scans the first time. With Silverscanner's built-in gamma correction, you get clean, bright scans with excellent detail in those hard-to-get areas that don't require difficult adjustment like other scanners. This can mean substantial time savings when every second counts.

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of our image.



Microtek 600ZS

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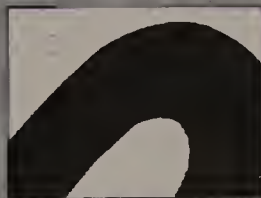
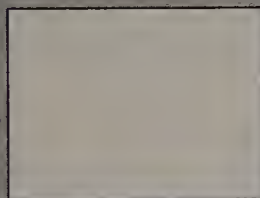
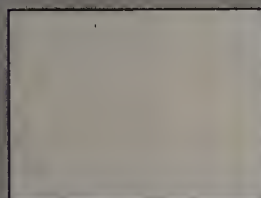
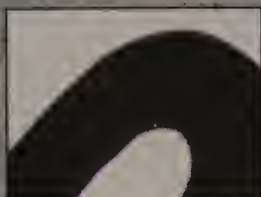
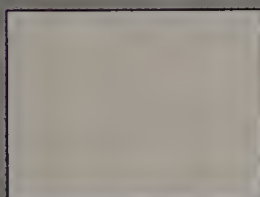
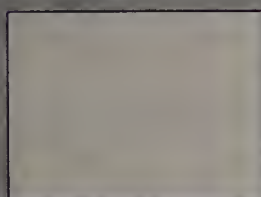
Howtek Scanmaster 3

\$8195**

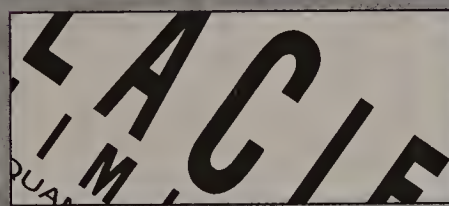


La Cie Silverscanner

\$1,399



All scans were done at default settings with no corrections. The color images were separated using Adobe Photoshop. The logo was scanned as grayscale and as line art. This entire ad was done on the Macintosh using Silverscanner, Photoshop, Quark XPress and a PostScript Imagesetter. The entire production cost was \$145.



Microtek 600ZS

1200 dpi at 400%—n/a

Howtek Scanmaster 3

1200 dpi at 400%—n/a

La Cie Silverscanner

1200 dpi at 400%

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1200 dpi at 100%

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Macworld, June 1991



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Letters

JUNE 1992

Kept Wishing

JUST FINISHED READING JERRY Borrell's March column (*Commentary*), and I can't agree with him more. Apple is just not keeping up with the Joneses, or the Borrells or the Stevenses for that matter. Hardware capability has fallen way behind the capabilities of many leading-edge applications. I'm not sure how much longer I can remain a loyal Macintosh user as long as my needs keep outdistancing the hardware Apple is developing.

Larry Stevens
Atlanta, Georgia

LET'S SEE IF I GOT THIS RIGHT. IBM got Apple's system code and Apple got the IBM dress code. Since the 5th of July, Apple stock is up 50 percent and IBM's is down 25 percent. I don't know what the dress code has to do with anything, but either IBM did not get much or it doesn't know how to use what it did get!

And about that PrintMonitor. The first System 7 problem I encountered was with PrintMonitor. After I spent 90 days with the System 7 answer line, my problem continued but the assistance didn't. Now, some six months later, I have found that if I turn off the background printer in the Chooser the machine starts every time and I have far fewer printing problems.

Am I the only one who has this problem? Nevertheless, I have no plans to trade in System 7 or my Apple stock.

Larry Hacker
Mabelvale, Arkansas

Forgotten CAD

READ WITH INTEREST DAVID Peltz's response to the December 1991 *Commentary* by Jerry Borrell regarding the state of Macintosh CAD (*Letters*, March 1992). I think both missed the point. Borrell is correct: Macintosh CAD is in a sad state. Unless you include as CAD nontraditional activities such as photo-realistic

visualization, the Mac is woefully short of its competitors in market share.

I do agree with Peltz that the Mac's market share in this area is growing, but given the basic graphical nature of the Mac and the performance of the Mac II line, Apple should have been able to grab a major portion of the routine day-in, day-out 2-D design and drafting market several years ago. This market is significantly larger than the visualization market *Macintosh Engineering & Scientific Report* and *Macworld* write about. And to date, Apple is simply ignoring it.

Gary Shellenberger
Clearwater, Florida

Modem Rambos

STEVEN LEVY, YOU EGOTISTICAL %\$#@head. Heh, just kidding. Levy has hit the nail precisely on the head (*The Iconoclast*, March 1992). People love to appoint themselves King o' the Net. Usually it's when people are on new virtual turf, away from their normal stomping grounds, that they take an aggressive stance on some issue. They figure that they'll never visit there again and it's usually 500 miles away from their desktop.

Although computer communications have been around for a few decades now, it's surely an eighties, oops, nineties Rambo-complex kind of thing.

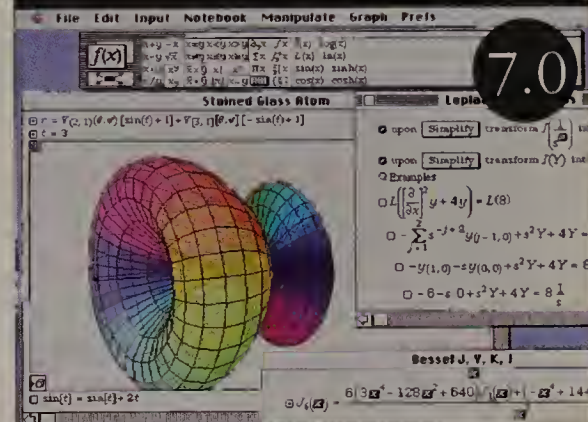
Steven Mills
Iowa City, Iowa

FREEDOM OF EXPRESSION IS ONE of the most important issues in our nation, and in the budding electronics area we need to be aware of the power of our own expressions. I think people will always need a vent; the idea that volume and livid fervor might become an acceptable substitute for thoughtful discourse is worrisome at best.

Brian Wanamaker
Capitola, California

continues

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— MacWorld magazine, May 1990.

— Five mice review, MacUser magazine, June 1990. 🐭🐭🐭🐭🐭

"Theorist... surpasses the highly rated Mathematica... in interface and execution."

— MacUser magazine, Editor's Choice Award, Best Math Program of 1989.

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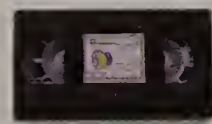
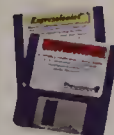
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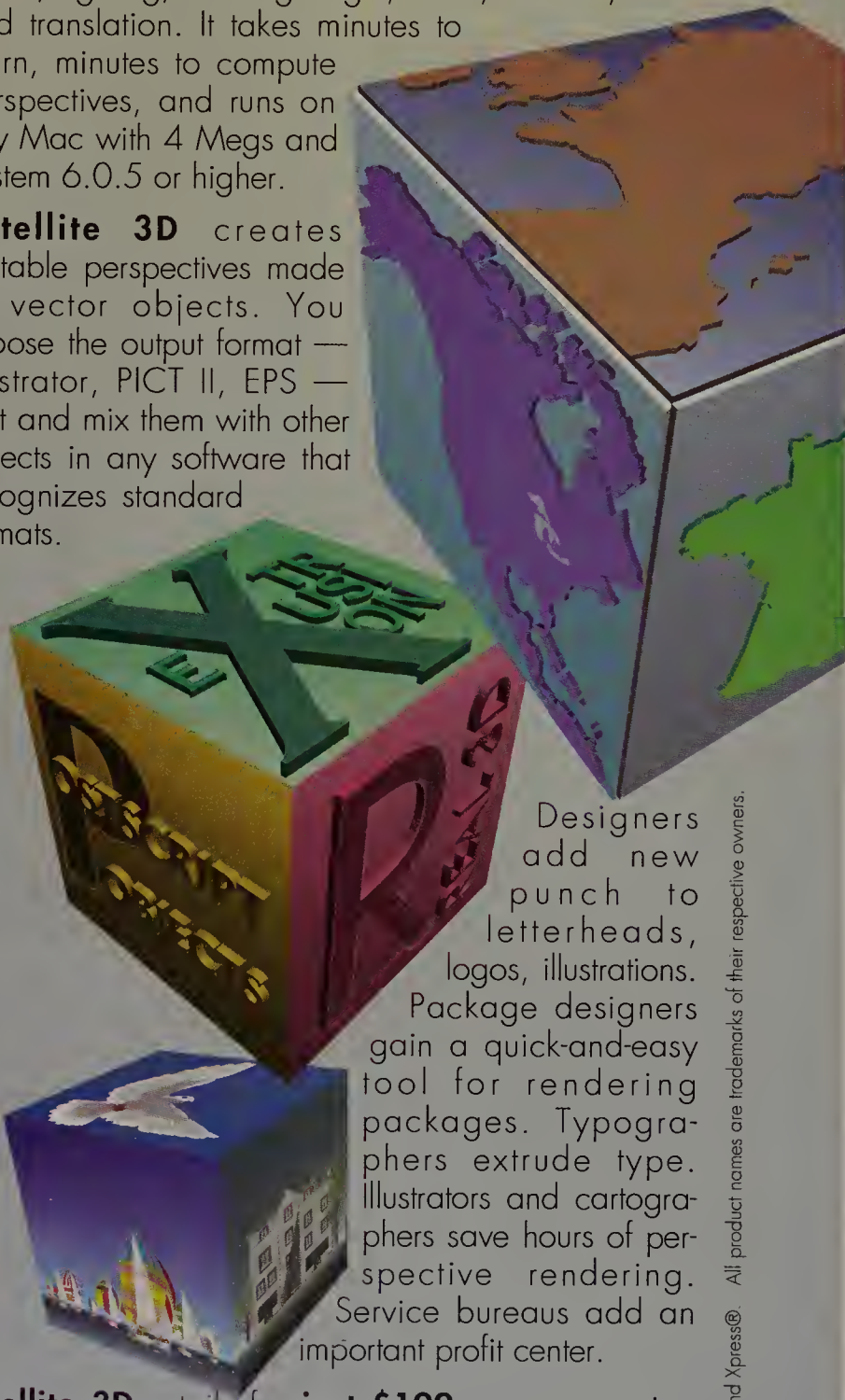
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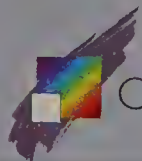


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LETTERS

CORRECTIONS

Ron Chan created the illustration in the photo on our April 1992 cover.

The correct fax number for Deneba Software is 305/477-5794 (Where to Buy, April 1992). Deneba does not have a toll-free sales line.

PLI's drives support A/UX partitions; PLI offers toll-free and on-line technical support, two-day repair turnaround, and free data recovery on request ("Seeking Midrange Hard Drives," February 1992).

Our review of Carbon Copy Mac 2.0 refers to Timbuktu, not Timbuktu Remote (Reviews, April 1992).

Electronics Plus's toll-free number outside of California is 800/548-7135 (Quick Tips, April 1992).

APS drives reviewed in "High-Capacity Hard Drives" (May 1992) do not contain contradictory information about termination.

MACWORLD HAS RESORTED TO printing hit pieces on readers who dare to bring to the attention of the publication the errors and misinformation that are in its pages. Anybody can make mistakes. What sets a professional apart from an amateur is that the professional is able to recognize, admit, and correct mistakes. The amateur justifies, covers up, and hides mistakes—condemning anyone who dares to bring a mistake to light. Your reviewer had the integrity to admit some of his mistakes on a public bulletin board service, according to Levy. But what has *Macworld* done in its pages? Ignored the issue and attacked those who brought the issue to light.

*Brent Duncan
La Selva Beach, California*

IN RESPONSE TO THE ICONOCLAST and in defense of the reviewers who write for your magazine, I would also feel angry, hurt, and frustrated if the program I just bought had a serious flaw that the reviewer of the product did not mention because he or she was worried about upsetting people.

*Jonathan Dennerlein
Cincinnati, Ohio*

Automating E-Mail

THE DAY YOUR ARTICLE APPEARED (*Lab Notes*, February 1992), our users starting calling us to say they use Tempo II Plus to automate their E-mail in much the same way you described needing to.

A Tempo macro can proceed in different ways, based on the presence of an alert dialog box, the message in the alert box, or even an image on the screen. And when you add conditional repeats to that conditional branching ability, a Tempo macro can perform the exact number of steps you need.

*Richard Barron
President
Affinity Microsystems
Boulder, Colorado*

Hard Drives: On or Off?

WHAT ARE THE ADVANTAGES TO leaving a hard drive on all the time, even when not in use (*Conspicuous Consumer*, March 1992)? Some people say leaving your equipment on saves wear and tear on the hard drives' disk mechanism. Others claim that leaving your equipment on only wastes electricity. I am confused.

*Jeff Liss
Minneapolis, Minnesota*

Drives built today have much higher mean-time-between-failure ratings, and turning a drive on and off should not have any noticeable effect on the life of the drive. With the dropping price of hard drives

and the rising cost of electricity, the money you save by turning your hard drive off when it's not in use could possibly be enough to buy a larger, new drive when you need it.—Ed.

Tips for Monitors and Memory

IHAD TO THANK YOU FOR THE ARTICLE "Color Display Bargains" (March 1992). I'd just put in an order for a IIci and had very little money left when my mail arrived, bringing with it the latest issue of *Macworld*. This is the first time any magazine has given me the information I desperately needed just when I needed it most. Is Galen Gruman a mind reader?

Lon Poole in *Quick Tips* (January 1992) mentions some Macs that either work well or don't work well with the two-chip 1MB SIMMs. However, he didn't mention which category the IIfx or the IIfx fall into. The new Macs weren't mentioned either, but I assume these SIMMs work well with them.

*Traci Espinet-Marquez
via America Online*

Lon Poole's source of information, an Apple Service Note, didn't report on compatibility with any Macs other than the ones he mentioned. Other sources haven't noted any incompatibilities with the two-

chip 1MB SIMMs and the IIfx, IIfx, and newer machines. However, those upgrading memory would be well advised to check with their dealer for updated news on compatibility, or to use only eight-chip 1MB SIMMs.—Ed.

Decompressing to DOS

DAVID POGUE'S REVIEW OF FILE-compression software for the Macintosh (*The Desktop Critic*, March 1992) was like taking the subway in New York: crowded, bumpy, and it missed my stop.

While he did mention that several of the Macintosh files can decompress text files compressed on the DOS side, there is precious little support for the DOS user who wants to decompress a text file archived by any of the Macintosh programs covered.

As it stands, StuffIt Deluxe (I'm told by Aladdin support) allows a Mac to compress a file into the old StuffIt 1.5.1 shareware format. Once in that format there are several DOS utilities that let a PC unzip those files; but none work with the new and improved commercial Macintosh versions.

*Bill Gram-Reefer
Concord, California*

continues

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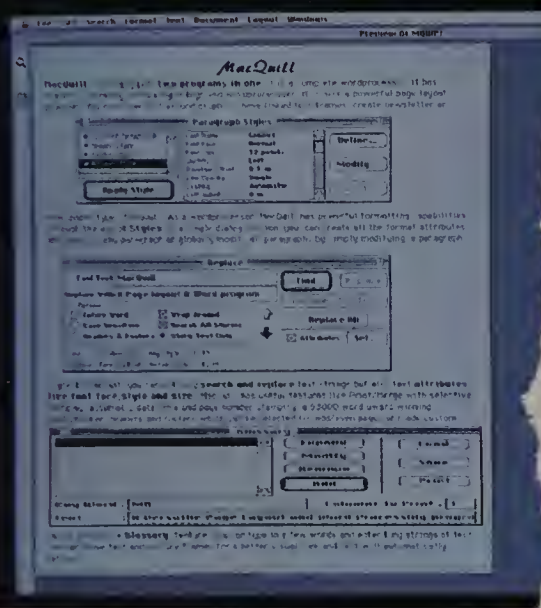
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More on the New Look

SINCERE CONGRATULATIONS ON your new layout design. In this day and age when computer publishing allows publications to change their format as often as changing socks, I hope that *Macworld* will stick with this design. The February issue was a pleasure to read.

The biggest improvement overall was, by far, the *Macworld News* section with its free-flowing style. I usually found this section quite lackluster, and it ended up being the part of the magazine that I read during porcelain library visits.

Christopher Hyatt
Pittsburgh, Pennsylvania

WHAT ON EARTH HAVE YOU done to your magazine? *Mac-Bulletin* looks like an advertisement; I almost passed it by. Jerry Borrell's and Steven Levy's departments look positively cramped—whoever put the layout together must feel that leaving white space is the eighth deadly sin. On top of that, the pages of those two departments are strikingly uninteresting visually: no color, precious little variation in typeface, and black-and-white photos of the authors.

The *News* section is just the opposite taken to an extreme. Four skinny little

columns; two different heading and body text fonts for the items; some sidebar items on a color background, others with a color box around them; some sidebars one column wide, others two; pictures scattered hither and yon. If the departments were visually uninteresting, the *News* section was a cacophony of fonts, boxes, and colors.

I have no quarrel with your writers and editors. Just stand back and look at the layout again, okay? I don't think my eyes can take too many more issues like February's.

Eric Rountree
Halifax, Nova Scotia, Canada

IHATE YOUR NEW PAGE-LAYOUT style. I have no desire to look through the magazine, much less browse or enjoy. The one improvement you've made is with the *Contents* page. After that it is a trip backward. I never minded the ads as long as the articles stood out more than the ads. That day seems to be gone. Now it's hard to find or distinguish the feature articles quickly first before settling back with the ads later. I'm hoping this is just a transition period on the way back to a good look.

Betty Horner
Milpitas, California

Retail or Mail Order?

IAM A BIG FAN AND USER OF CREDIT card-based mail-order merchants, but my most recent CPU shopping led me to a big surprise. The nearest mail-order competitor charged at least \$100 more for a CPU than the walk-in retailer did, even including the tax. It seems the walk-in store paid attention to Apple's price reductions, while the mail-order companies think their CPUs are extra special.

Thomas Burke
Austin, Texas

JUST BOUGHT MY FIRST MAC through the mail. The mail-order vendors know more about the hardware than the dealers do. They were willing to work with me and answer my questions. On the other hand, when I told the local Apple-authorized reseller I was more interested in processor speeds of the LaserWriter IIg and the IINTX, he failed to see why. Does Apple really expect me to pay full list price to a company that doesn't even know what it's selling? The key to successful mail ordering lies in knowing what you want. Being an informed consumer is essential.

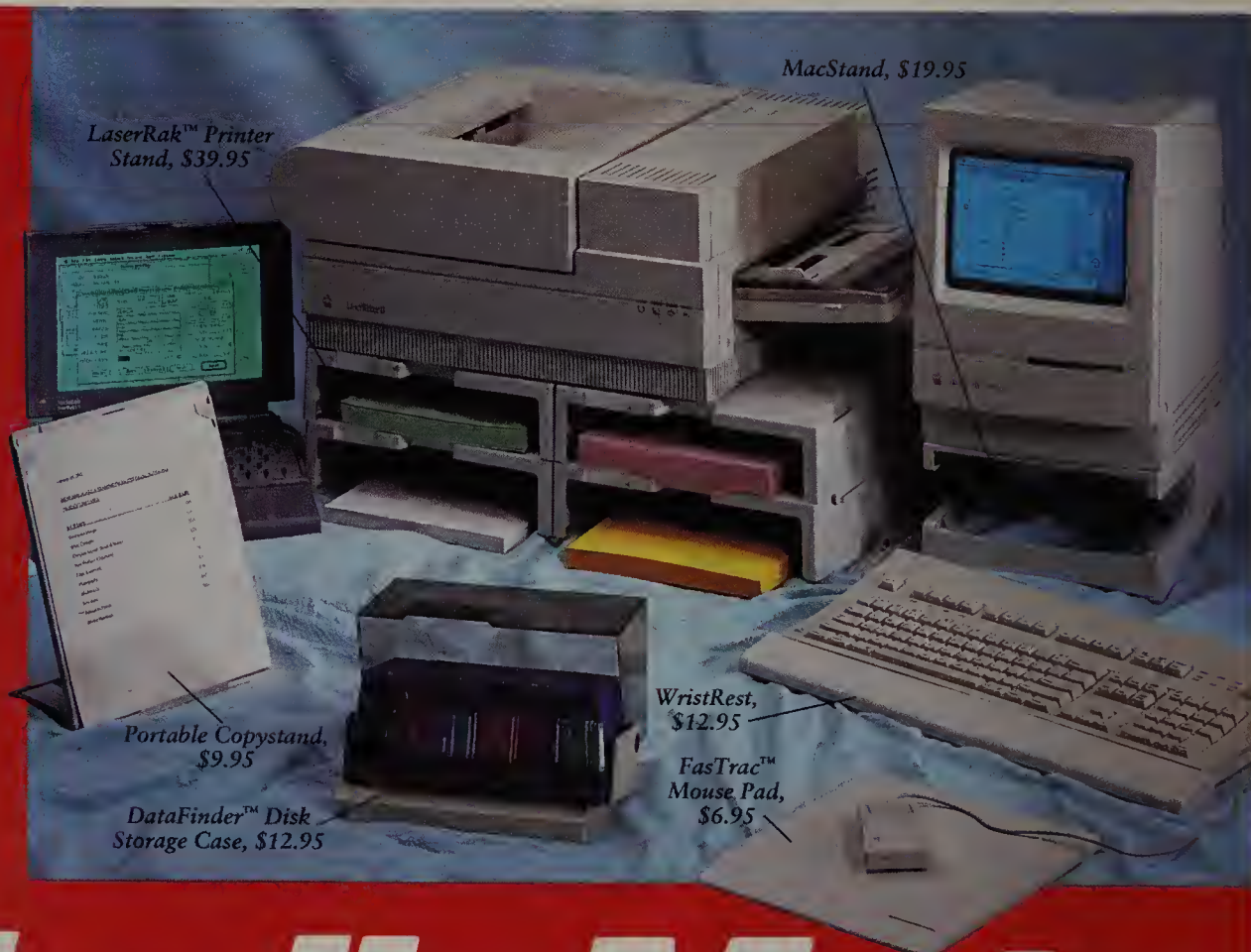
Paul Saccone
Paoli, Pennsylvania

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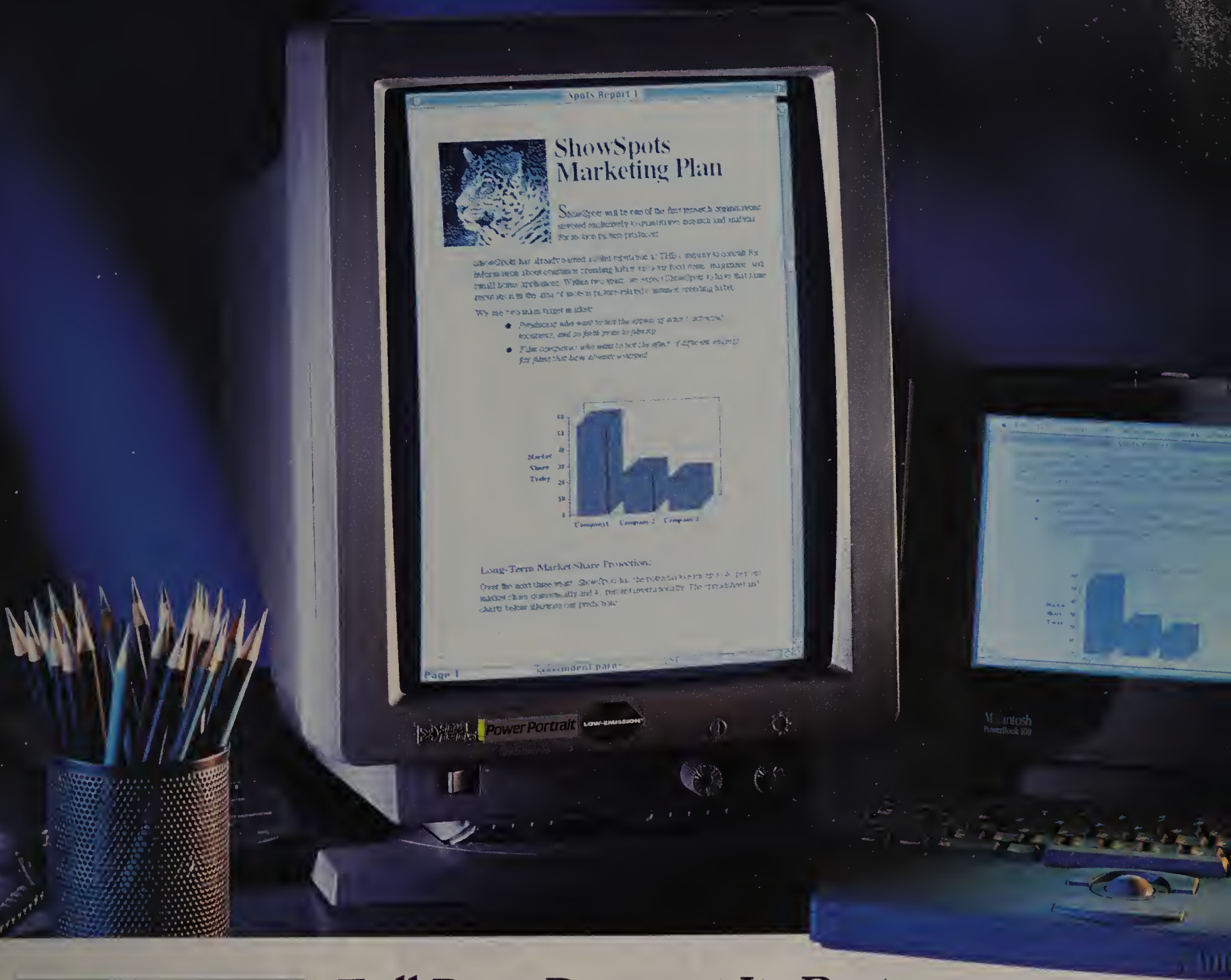
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Loving the System 7 Finder

IN RESPONSE TO THE LETTER BY Lawrence C. Stedman (*Letters*, March 1992), I want to say I find the enhanced Finder in System 7 the best thing going. It makes for the easiest computer interface on the market today and therefore should be the most productive. Of course there are basic concepts to learn to master its use, and there always will be. There is no such thing as a computer that is set up for every user right out of the box. If computer manufacturers tried to put everything everyone would like into their operating system, you wouldn't like it.

Mark Esposito
Houston, Texas

Power Psychology

JUST WHAT DOES EVERYONE WANT from a Mac or any computer? What we want, admit it or not, is power. Power to manipulate information, to understand, to journey to new lands in cyberspace. If there were a Motorola 68090 that could manipulate the space-time continuum, we would all want it too. Perhaps the greatest needs of all are to understand and to create, and that is what drives us toward

increased speed, productivity, performance, and potential.

The Macintosh graphical user interface is a most elegant extension of human learning psychology. Pundits in Macland worry about gifts to IBM and the unfriendly monoliths of corporate America. If Apple can only give this gift to IBM, then what a wonderful gift it will be.

Roger Fuller
Sabattus, Maine

Curious about ELF

IAM WONDERING IF MORE SPECIFIC research results on the VLF/ELF emissions issue have been published since July 1990, and if so, is it possible to obtain reprints.

Laurie Hoey
Point San Quentin, California

Macworld Lab tested the extremely-low-frequency magnetic emissions of 32 color monitors in "Seeking ELF Relief," October 1991. Macworld Lab also tested seven color monitors for "Color Display Bargains," March 1992, including model M1297, Apple's new low-emission 13-inch color monitor. Back issues are available for \$6 each from Snyder Newell, Inc., P.O. Box 7046, San Francisco, CA 94120-9727.—Ed.

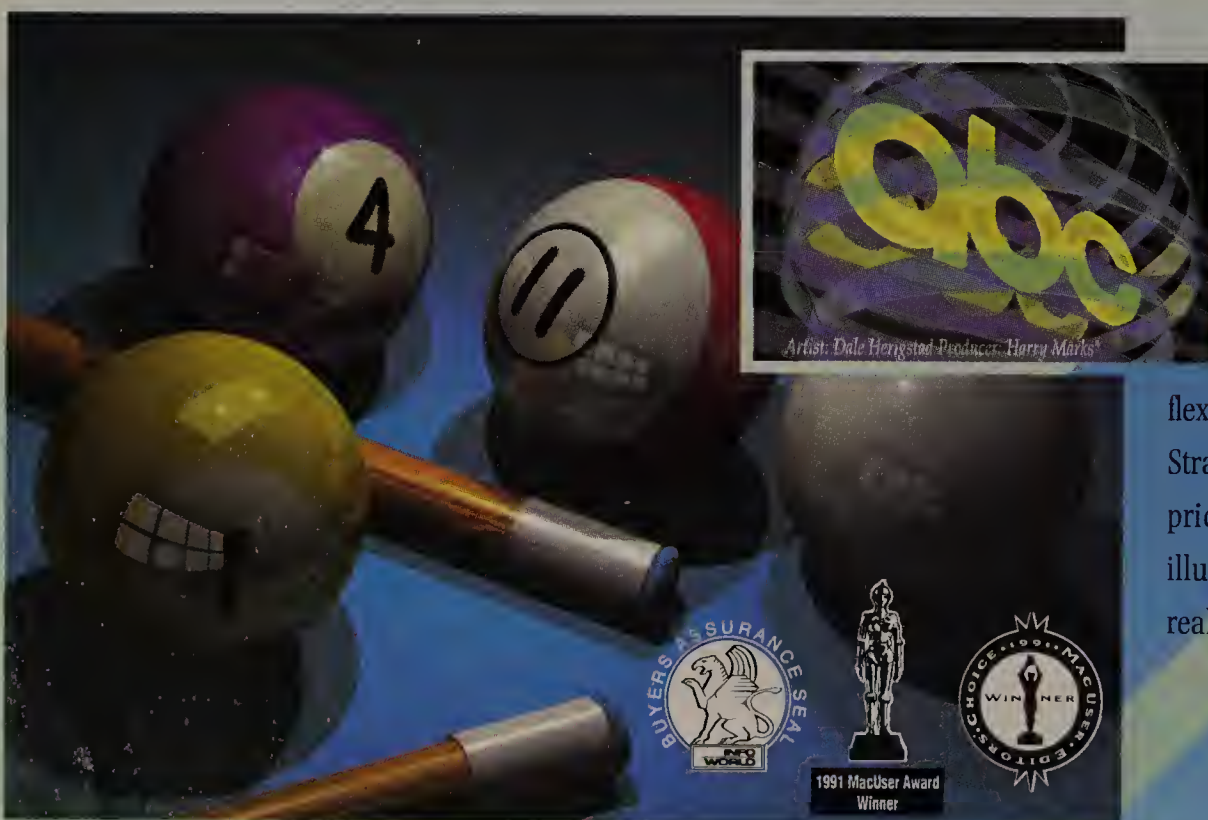
Adapt to Gray-Scale

YOUR JANUARY 1992 ARTICLE "GETting Started with Choosing a Mac" said some unflattering things about the SE/30's video capabilities. It says the monochrome screen can't display shades of gray. The problem lies not in the screen, but in the monochrome video circuitry. Micron Technology (208/368-2100, 800/642-7661) offers a gray-scale adapter that rectifies the problem. Also, the SE/30 has 32-bit color QuickDraw resident in ROM and can access gray and color external monitors. This ability for video expansion was one of the reasons I chose the SE/30. I have no desire to downgrade to the Classic II.

Charles Albrecht
Arvada, Colorado

Letters should be mailed to *Letters*, Macworld, 501 Second St., San Francisco, CA 94107, or sent electronically to CompuServe (70370,702), MCI Mail (294-8078), America Online (Macworld), or AppleLink (Macworld1). Include a return address and a daytime telephone number. We regret that, due to the high volume of mail received, we are unable to respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of Macworld. **m**

PHOTOREALISM



Artist: Jon Watson; image modeled and rendered entirely in StrataVision 3d.

StrataVision 3d is realistically the best 3D program on the Mac. ● Already donned with top industry awards, there's even greater power with version 2.5. New modeling features give you more control over objects. Apply realistic textures, set reflectivity and soften shadows with improved ease. Animations of flexible objects offer stunning results. StrataVision 3d 2.5 still has a realistic price; \$995. ● Whether you're an illustrator, a designer or an architect, we have the realistic solution. Call toll-free 1-800-869-6855 today.

STRATA
The Virtual Studio™ Company.
Strata, Inc. / 2 West St. George Blvd., Suite 2100 / St. George, UT 84770
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*StrataVision 3d created the ABC image for animation storyboards. StrataVision and StrataVision 3d are trademarks of Strata, Inc.

Circle 293 on reader service card

Which Comes First...

DUAL PAGE MONO-CHROME DISPLAY WITH VIDEO CARD

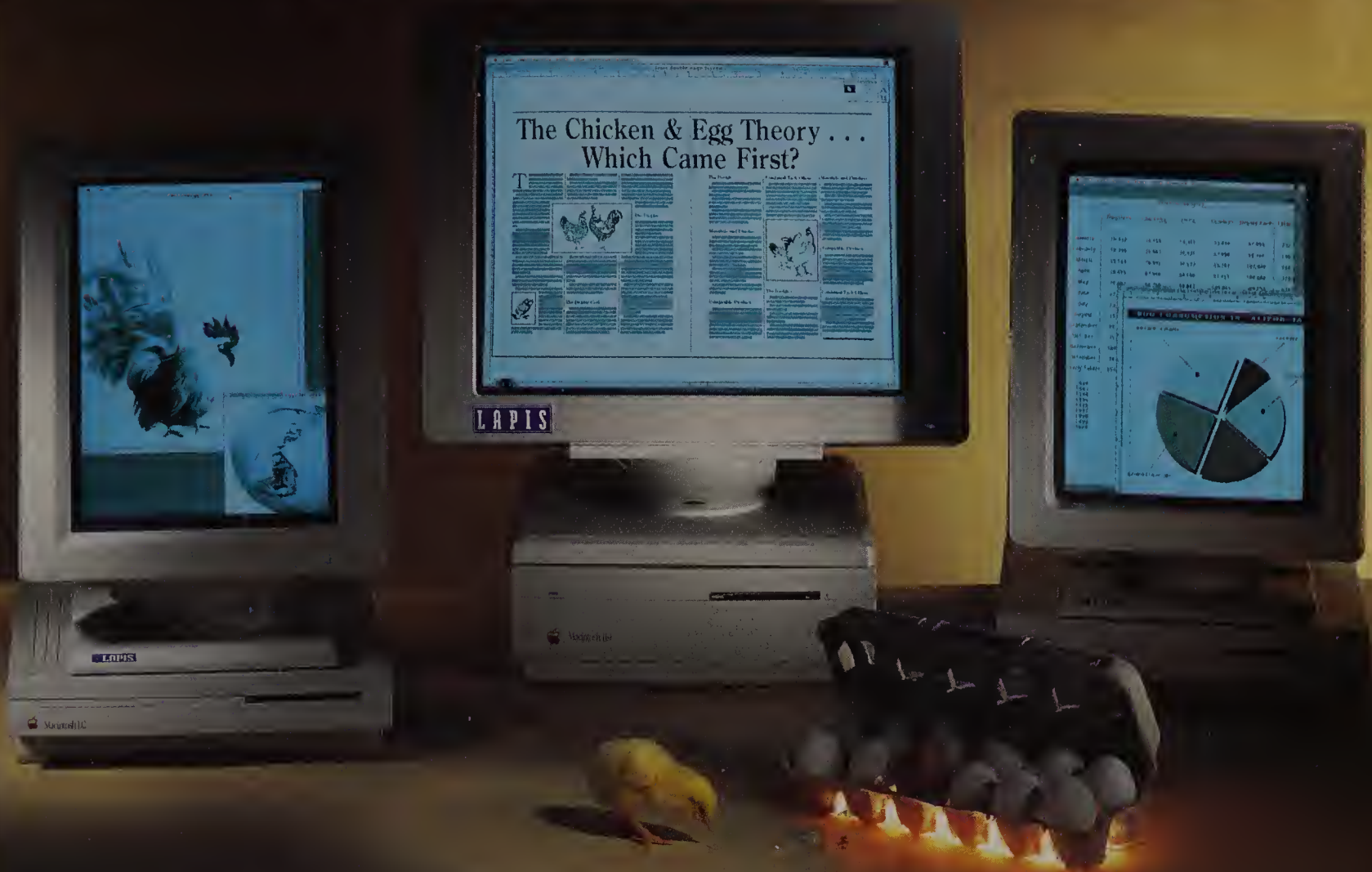
Screen size (flat) —
19 inch diagonal
Resolution — 74 DPI
WYSIWYG (same as
Apple Two Page)
Vertical Refresh
Rate — 75 Hz

FULL PAGE MONO-CHROME DISPLAY WITH VIDEO CARD

Screen size (rounded) —
15 inch diagonal
Resolution — 80 DPI
WYSIWYG (same as
Apple Portrait)
Vertical Refresh Rate —
75 Hz (same as Apple
Portrait)

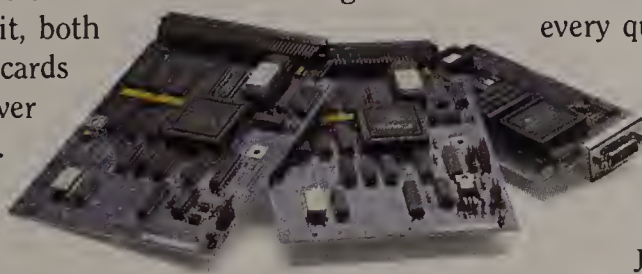
FULL PAGE GRAY-SCALE DISPLAY (256 SHADES) WITH VIDEO CARD

Screen size (flat) —
15 inch diagonal
Resolution — 80 DPI
WYSIWYG (same as
Apple Portrait)
Vertical Refresh Rate —
75 Hz (same as Apple
Portrait)



The Display Card or the Display?

Silly question. For Lapis owners that is. You won't have to spend another second debating which comes first, because at Lapis they both do. Take our cards, for instance. For those of you who already have a monitor, we've got the most comprehensive line of display cards to drive it, both monochrome and color. We also have display cards for every Macintosh computer. In fact, you'll never have to go anywhere else for a display card. We've got all the bases covered. And when you turn to Lapis for a display solution, whether dual page mono-chrome, full page gray scale or full page monochrome, you'll get more than just a monitor, you'll get an entire system, Lapis card and all. You see, sometimes



Lapis has a full line of Apple-compatible, fixed and programmable, display cards.

it's okay to put all of your eggs in one basket. So whether you're in the market for a display card or a complete display solution, Lapis makes sure that you'll always come out first. Of course that also goes for our service and support. We'll answer every question you ever wanted to ask when you call our technical support line. (Just don't try that chicken and egg one, it gets 'em every time.) Just call us at 1-800-43-LAPIS for the location of the nearest Lapis dealer. Any more questions?

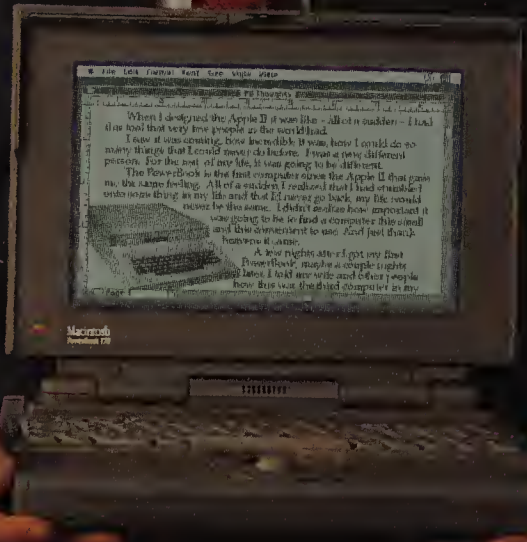


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End users circle 202 on reader service card

Dealers circle 204 on reader service card



PowerBook.

"One of the best-designed
products of the year."

-Time

"One of the best
products of the year."

-Fortune

"Hardware product of the year."

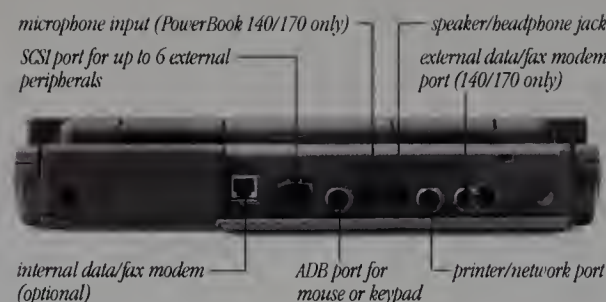
-InfoWorld

"One of the best new
products of the year."

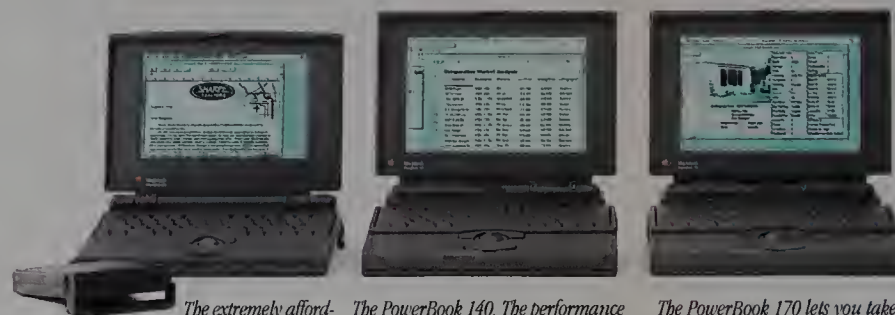
-Business Week

The power to be your best.





PowerBook.



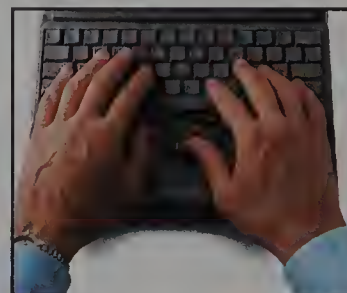
The extremely affordable PowerBook 100 offers twice the performance of a Macintosh Classic.*

The PowerBook 140. The performance of a Macintosh IIcx engineered to fit into a mere 6.8-pound package.

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Every PowerBook can run thousands of Macintosh business and education programs. And with the built-in Apple® SuperDrive™ (an external option on the PowerBook 100), it can read from or write to MS-DOS formatted disks, too.

PowerBook	Weight	Memory	Hard Disk	SuperDrive	Processor	Internal Modem
100	5.1 lb.	2/4MB	20/40MB	Optional ext.	16 MHz 68000	Optional
140	6.8 lb.	2/4MB	40/80MB	Internal	16 MHz 68030	Optional
170	6.8 lb.	4MB	40/80MB	Internal	25 MHz 68030/ 68882 coprocessor	Optional

All PowerBook models expandable to 8MB RAM.

The new PowerBook™ computer from Apple is more than the lightest, smallest Macintosh® computer ever.

It's a whole new standard of mobile computing.

It's light. It's small. And it boasts the kind of bright, backlit, high-resolution screen required for Macintosh-quality graphics.

It's expandable. It's affordable. And its unique design makes it extraordinarily comfortable to use even in the most uncomfortable coach seat.

System 7 is standard equipment. So is a rechargeable battery that runs for up to three hours.

It even includes a remarkable new program called AppleTalk® Remote Access. This allows a modem-equipped PowerBook to tap the power of your desktop Macintosh — and any office network that supports AppleTalk — from just about anywhere there is a telephone.

You can retrieve files from the Macintosh in your den without leaving your hotel room. Or print an order form on a printer in your office without leaving your client's office. Or send e-mail from wherever you happen to be to anyone on your network.

With an internal data/fax modem, you can even send your work directly to fax machines.

It's the power to work anywhere you want, anytime you want, in whatever way works best for you. The power to be your best.*

The power to be your best.



For the name of your nearest authorized Apple reseller, call 800-446-3000, ext. 700. To run MS-DOS software, simply install a program like SoftPC. © 1992 Apple Computer, Inc. Apple, the Apple logo, AppleTalk, Macintosh and "The power to be your best" are registered trademarks, and PowerBook and SuperDrive are trademarks of Apple Computer, Inc. Classic is a registered trademark used under license by Apple Computer, Inc. MS-DOS is a registered trademark of Microsoft Corporation. SoftPC is a registered trademark of Insignia Solutions Inc. InfoWorld is a trademark of InfoWorld. This ad was created using Macintosh computers.

A true culinary adventure

The one-and-only *Marlows' Cafe*.

Every town has one – if it's lucky. A place where the locals come to chew the fat (so to speak), drink their coffee, digest the local gossip, and talk politics for hours on end. In our hometown that place is *Marlows' Cafe*. No spelling error here: you see, the locals call themselves "Marlows." And this place definitely belongs to them.

It's been a diner of sorts for years – at one time it was a Harley-Davidson shop. But when Darlene and Ray bought it early last year they really turned it into something special. Not only did they do extensive renovations – Ray's a contractor when he's not running the grill – they also transformed



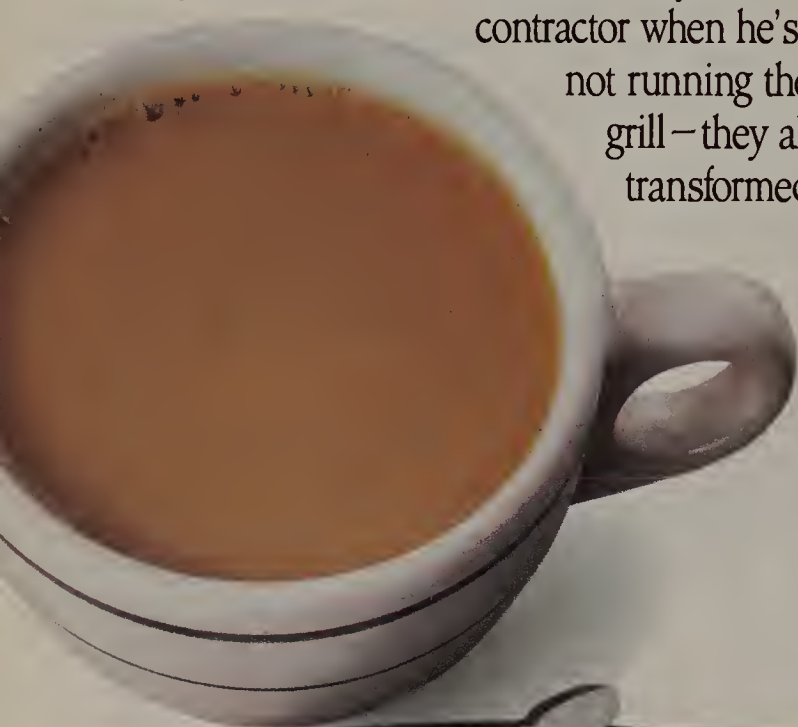
Get this coupon free with your order 'til 6/30/92.

it into what Darlene proudly calls "the greatest conversation place ever. Even flatlanders are made to feel right at home."

You'll never go hungry buying from us.

Because we'll always give you everything you need: the best information, the best service, the best support, and now, even the best food.

You see, we figured it would give you a nice feeling to know that, no matter what, there's always a free home-cooked meal waiting for



R
and
hors
Tuna

waits you in Marlow, NH.

you here in Marlow. That's why we're enclosing the coupon pictured above in every order we ship until June 30, 1992.

Keep it in your wallet or pin it on the wall. Either way, you can rest assured that next time you get a hankering for homemade chicken vegetable soup, or a Cheeseburger Deluxe (Thursday's special), or some raisin/cinnamon bread pudding, you can just hop on a plane, train, or car and point yourself in our direction.

You want atmosphere?

Marlows' Cafe takes the cake.

There are great old photos of Marlow on the walls and even a letter from the White House thanking Darlene for her invitation to the president to visit during the primary. Outside, a big sign offers the daily special and/or a tasteful greeting like



Darlene is all ready to take your order at Marlows' Cafe.

"Buy American, eat here!" or (during hunting season) "Stop here or we'll shoot." And if you can't clean your plate, don't worry. All the leftovers are recycled by the neighborhood hogs.

As waitress and songwriter Diane puts it: "Yes everything tastes finer/'Cause you see it being made. Come to Darlene's Marlow Diner/ So we can get paid."



We're first in more

Non-stop innovation since

1. Overnight Shipping 'til 3:15 a.m. \$3.



What we'd *really* like is to be able to deliver your order a couple of seconds after you call. Unfortunately, the old space-time continuum makes that a bit difficult, but we have taken some quantum leaps in that direction. We were the first Mac company to offer \$3 overnight shipping. And with our distribution center at Airborne Express, we can keep taking orders for "overnight" delivery of in-stock items 'til 3:15 a.m. Eastern Time.

2. Order Weekends. Get it Monday. \$3.

Working on the weekend? Call us Friday (or 'til 3:15 a.m. Saturday) and we'll deliver by Saturday. Ordering on the weekend? Call by noon Sunday, and we'll deliver on Monday—which makes a

whole lot more sense than having to wait 'til Tuesday. This service is for in-stock items and isn't available to all areas, but it is in most places. The cost? Still just \$3.



SATURDAY SUNDAY MONDAY

3. Toll-Free Technical Support.



Some people don't want to call our toll-free tech support line because they think it's just for real complex questions. Well, even though we enjoy a good challenge now and then, we like the easy questions, too. After all, they're easier to answer. So whether you're using a product you just bought or discovering some strange wrinkle a few years down the road, give us a call. And find out why we were a 1991 *Macworld* World Class Award Nominee for Best Customer Support!

4. 30-60 Day Money-Back Guarantees.

Accept no substitutes! This is the only true money-back guarantee program, covering both opened and unopened boxes. If a product doesn't work out, call for a return authorization and send it back with all the original packaging. Just check the line listing to see if (and for how long) the product you want is covered. (Note: in rare cases we've had to limit the number of returns.)



ways than one.

984. And counting.

5. No Foam Peanuts.



Instead, we use a packing paper that's made from recycled magazines. And we print our catalogs on recycled paper. And we have an in-house recycling

program that has reduced waste by 75%. And we make a concerted effort to encourage our vendors to minimize packaging. All of which puts us and our hometown of Marlow, NH (pop. 600 or thereabouts) at the forefront of Mac environmental politics. A position we're happy to share. Any ideas?

6. One-Minute Mail Order.

This little breakthrough is as much about ease as it is about speed. We use Caller ID* to access your previous ordering information instantly. Which means you don't have to rattle off all your vital statistics for the umpteenth time. So if you know



what you want, including product numbers, we can take your order in record time. It's convenient, fast, and another way we keep our costs and your prices as low as possible.

7. A Free Lunch!

We don't want our customers to ever go away hungry. So from now through June 30, 1992 we're including a coupon for a free meal at Marlow's Cafe with every order. Just

stop by next time you happen to be driving through Marlow on your way to Goshen, Gilsum, Stoddard, or Alstead. What's that? You don't have any plans to visit rural New Hampshire in the near future? Why not make a little detour next time you go to Boston? (Or a really big detour next time you go to Tokyo?) Don't worry, the coupon's good as long as Darlene and the crew are still really cookin'. And, until you make it up here to Marlow, the coupon is certainly suitable for framing.



*We can block at your request.



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Endless storage possibilities.

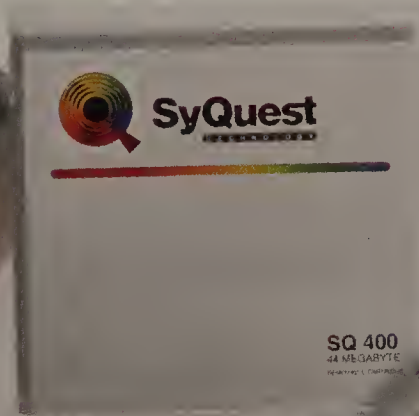
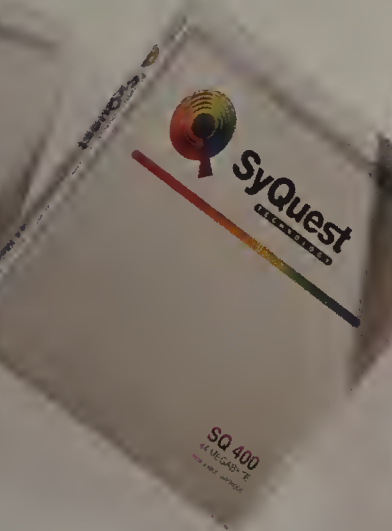
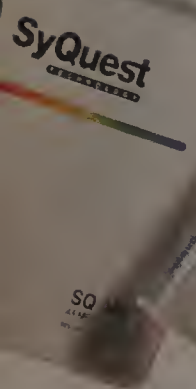
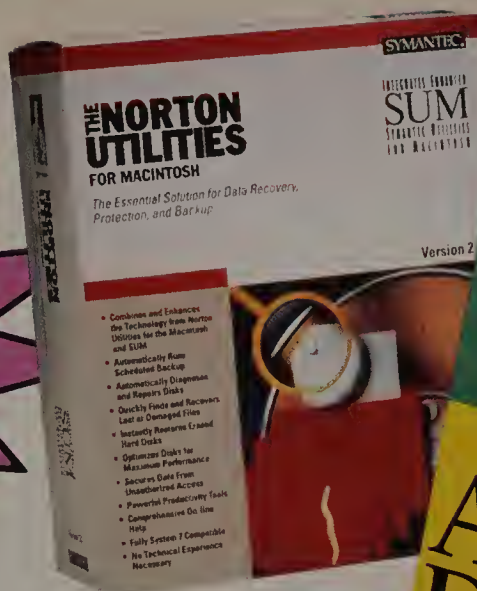
Removable cartridge drives are the answer for anyone archiving or transporting multi-megabytes of data—in other words, anyone trying to deal with today's sophisticated applications. And now we're selling MDS drives at a super-low price to make this essential technology available to more users. **MDS Drives** feature the

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Both drives have a 20ms average seek time—fast enough to use as your everyday drive as well as for backup—and 60,000-hour MTBF

(mean time between failure). Other features include a push-button SCSI ID selector (so you can change the SCSI ID without special tools) and two switched power outlets (to power the drive and two other devices from a single switch). MDS drives are also easy to daisy chain because they have dual 50-pin SCSI connectors and an external terminator.

**Your Choice.
FREE.**



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MDS drives come with all the software you need for low level formatting of cartridges, selecting interleaves for fastest data access, defining partitions, and initializing partitions in either Mac or A/UX formats. There's also disk caching and volume password protection. You'll also get your choice of either *Salient's AutoDoubler* or

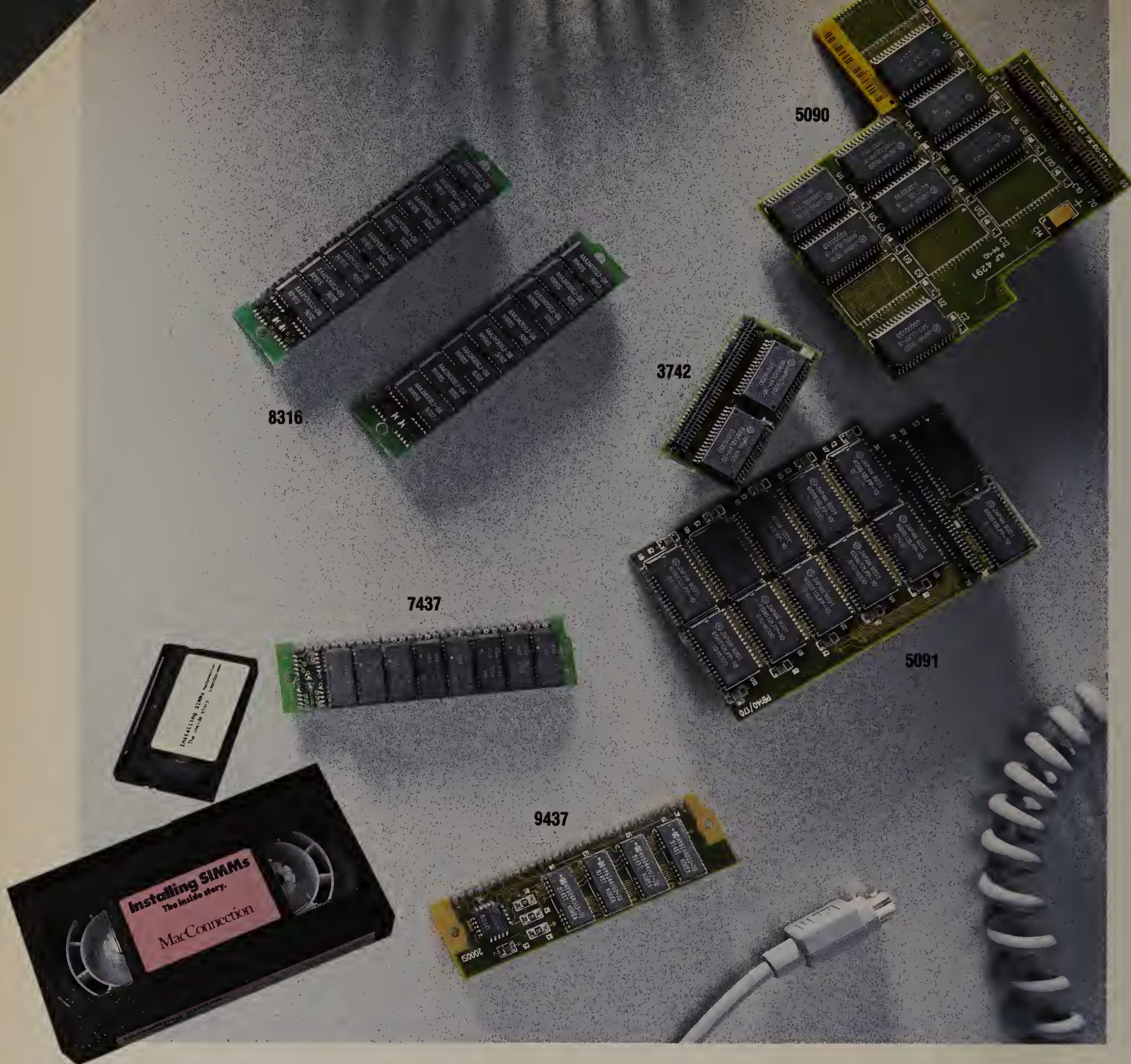
Symantec's Norton Utilities for the Mac with each drive you purchase at no extra charge.

It's quite a package: a dependable SyQuest drive mechanism, cartridge, formatting and operating software, and either AutoDoubler or Norton Utilities, all backed by a rock-solid 2-year warranty and our toll-free technical support. Ready to get removable? Give us a call.

MDS Drives ... 60 day MBG.

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Not enough RAM?

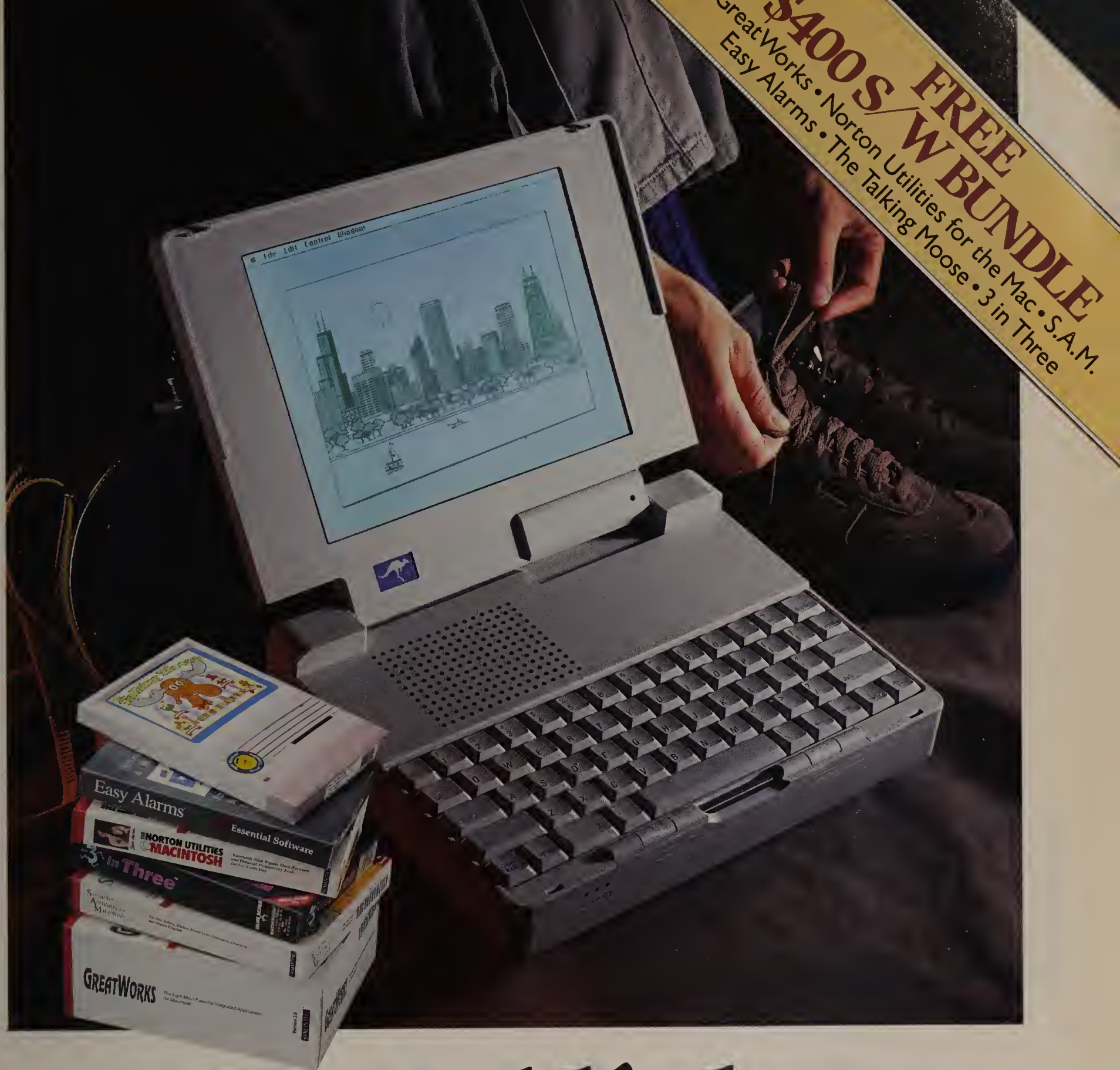
Get relief fast.

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5478	16 MB SIMMs Quadra 700 (4) . . .	2799.
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5090	4 MB . . . 269.	
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2147	2030E/442 (same w/math copro.)	2899.
2655	2030E/880 (68ec030, 8 MB, 80 HD)	3399.
2653	2030E/882 (same w/math copro.)	3499.
2106	2030S/460 (68030, 4 MB, 60 HD)	3399.
2105	2030S/462 (same w/math copro.)	3499.
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Electronic access control for the Mac.

The **MaccessCard Reader** is a very convenient new high-tech security add-on for your Mac. Forget about passwords. Working with **FileGuard** 2.5 or higher software, it controls access to your Mac using magnetically-stripped cards and an (optional) access key. You get two cards with the system, but you can quickly

train it to recognize *any* ID card, such as your credit card, company or student ID card.

After an authorized user has turned on your system with MaccessCard Reader, FileGuard can continue to control access to all or any part of it (specific hard disk partitions, folders, files, applications, etc.). *MacUser* (5/91) gave both the hardware and software a 5 Mice rating

and wrote: "It's sleek, fast and safe. I highly recommend it."

ASD Software ... 30 day MBG

- 9440 MaccessCard Reader (requires FileGuard) \$299.
- 7085 FileGuard 2.7 (1 user) 138.
- 9439 FileGuard/MaccessCard (1) Bundle 399.

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Uncover the mysteries, intricacies, and idiosyncracies of your Mac with **MacEKG II**, the complete diagnostic utility for user and specialist alike. Now with advanced chip-level diagnostics previously available only to Authorized Apple Technicians. This intrepid program looks at your entire system, including

the effects of applications loaded and accessories attached, and tells you how your resources are being used. Any processor hogs eating up performance? Any unnecessary INITs gumming up the works? MacEKG II will find them.

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were running. And you can use the Reactivator to repeatedly reboot while MacEKG II observes and maintains a log to point you in the direction of the problem. So make sure your Mac keeps on ticking with MacEKG II.

MicroMat Computer Systems

3732 7 MacEKG II (Apr. '92) \$110.



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MacroMind•Paracomp ... 30 day MBG

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Insignia Solutions

4089	Universal SoftPC 2.5.....	\$195.
3229	SoftAT 2.5.....	299.
3441	SoftNode 1.0.....	105.
3454	SoftNode 1.0 (10 user).....	699.
9726	Entry Level SoftPC 2.5.....	125.
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Aldus ... 30 day MBG

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Products preceded by ⑦ are compatible with **System 7**. For specific features of System 7, please ask your salesperson when placing your order.

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⑦ **Outbound Notebook Systems**—Includes 25 MHz or 33 MHz 68ec030, 4-14 MB of memory, a 40, 60, or 80 MB hard drive and math coprocessor option. Limited time offer: receive free software bundle (over \$400) with each unit. . . see listing.

COMPUTERS

Outbound Systems, Inc.

A MacConnection exclusive! Each Outbound Notebook includes a 1.4 Floppy Drive, slip case, power supply & a limited time special software bundle offer valued over \$400.

⑦ 2030E Series (25 MHz 68ec030)

2161	440: 4 MB, 40 MB HD	2799.
2147	442: 4 MB, 40 MB HD (incl. math copro.)	2899.
2110	460: 4 MB, 60 MB HD	2899.
2109	462: 4 MB, 60 MB HD (incl. math copro.)	2999.
2660	860: 8 MB, 60 MB HD	3139.
2659	862: 8 MB, 60 MB HD (incl. math copro.)	3249.
2655	880: 8 MB, 80 MB HD	3399.
2653	882: 8 MB, 80 MB HD (incl. math copro.)	3499.
2651	1660: 16 MB, 60 MB HD	3639.
2730	1662: 16 MB, 60 MB HD (incl. math copro.)	3759.
2714	1680: 16 MB, 80 MB HD	3859.
2712	1682: 16 MB, 80 MB HD (incl. math copro.)	3999.

★ MDS Drives ... 60 day MBG
MDS Removable SyQuest Drives come complete with one cartridge and all the software you need for low level formatting of cartridges, selecting interleaves for fastest data access, defining partitions, and initializing partitions in either Mac or A/UX formats. There's also disk caching and volume password protection. Plus, get a free copy of Salient's *AutoDoubler* or Symantec's *Norton Utilities for the Mac* with each drive purchased. Quite a package; and backed by a 2-yr. warranty.

5533 MDS 44 SyQuest w/AutoDoubler \$499.
5532 MDS 44 SyQuest w/Norton Utilities 499.
5534 MDS 88 SyQuest w/AutoDoubler 599.
5535 MDS 88 SyQuest w/Norton Utilities 599.
44 MB & 88 MB SyQuest Cart...	see line listing

⑦ 2030S Series (33 MHz 68ec030)		
2108	440: 4 MB, 40 MB HD	3199.
2107	442: 4 MB, 40 MB HD (incl. math copro.)	3299.
2106	460: 4 MB, 60 MB HD	3399.
2105	462: 4 MB, 60 MB HD (incl. math copro.)	3499.
2711	860: 8 MB, 60 MB HD	3639.
2684	862: 8 MB, 60 MB HD (incl. math copro.)	3759.
2673	880: 8 MB, 80 MB HD	3859.
2669	882: 8 MB, 80 MB HD (incl. math copro.)	3999.
2668	1660: 16 MB, 60 MB HD	4099.
2665	1662: 16 MB, 60 MB HD (incl. math copro.)	4229.
2664	1680: 16 MB, 80 MB HD	4349.
2661	1682: 16 MB, 80 MB HD (incl. math copro.)	4499.

DAILY BUSINESS

ACCOUNTING, DATABASES, SPREADSHEETS, WORD PROCESSING

A Lasting Impression

⑦ ResumExpert or Cover Letters	... ea.	48.
⑦ Other ResumExpert Editions	... ea.	48.

★ Aatrix ... 30 day MBG

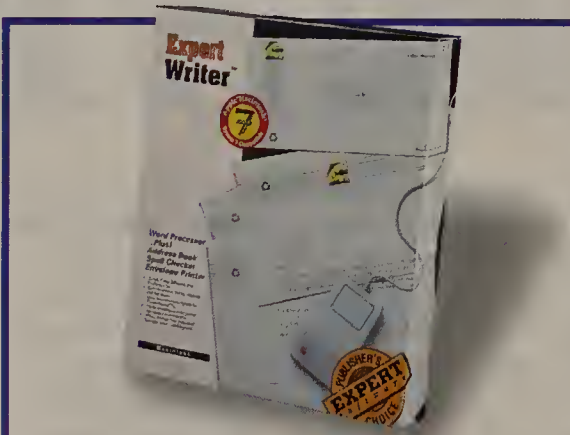
3976	⑦ Payroll 4.0	109.
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Abacus Concepts

4482	⑦ StatView SE+Graphics 1.04	219.
4481	⑦ StatView II 1.04	309.

★ Aclus ... 30 day MBG

5618	⑦ 4th Dimension 2.2.3	519.
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★ Expert Software ... 30 day MBG

5234 ⑦ **Expert Writer 1.0**—Quick, easy, efficient word processor plus address book, spell checker and envelope printer (with postal bar codes). Always available, uses less than 50K of RAM! Professional looking letters, faxes, memos \$29.

Amaze, Inc.		
4989	⑦ CATHY Daily Planner	39.
3582	⑦ The Far Side Computer Calendar	45.
Ashton-Tate/Borland		
1324	FullWrite Professional 1.0	25.
★ Avery ... 60 day MBG		
7446	⑦ MacLabel Pro 1.5	48.
★ Banner Blue ... 30 day MBG		
3548	⑦ Org Plus Advanced 1.0	125.
★ Baseline Publishing ... 30 day MBG		
8881	⑦ Thunder 7 1.0.5	55.
★ Beagle Bros. ... 30 day MBG		
3119	⑦ BeagleWorks	184.
3563	⑦ BeagleWorks Competitive Upgrade	95.
★ Checkfree Corp. ... 30 day MBG		
6928	⑦ Checkfree Mac 1.5	19.
★ CheckMark Software ... 60 day MBG		
5862	⑦ Payroll 4.6	169.
5863	⑦ MultiLedger 2.0 225. 3767 MultiUser	359.
★ Chena Software ... 30 day MBG		
1594	⑦ Fair Witness 1.1	315.
★ Claris ... 30 day MBG		
1129	⑦ MacWrite II 1.1V2	89.
3903	⑦ ClarisWorks 1.0 call 3743 ⑦ Upgrade	95.
3531	⑦ Claris Resolve 169. 3745 ⑦ Upgrade	95.
8216	⑦ FileMaker Pro 1.0V2	199.
1125	⑦ MacProject II 2.5V1	345.
★ Essential Software ... 30 day MBG		
4086	⑦ Easy Alarms 2.0 (May '92)	31.
★ Expert Software ... 30 day MBG		
5234	⑦ Expert Writer 1.0	29.
Fox Software		
5572	⑦ FoxBASE + /Mac 2.01	289.
★ Franklin Software ... 30 day MBG		
7070	Language Master 2.0	45.
★ Good Software ... 30 day MBG		
2527	⑦ REMS Property Manager 3.01	399.
★ Intuit ... 30 day MBG		
2507	⑦ Quicken 3.0	42.
★ JAM Software USA ... 30 day MBG		
6089	⑦ Smart Alarms Plus	63.
★ Kaetron Software ... 30 day MBG		
1091	⑦ Flow Chart Express	93.
8941	⑦ TopDown 3.1	199.
★ Lotus Development ... 60 day MBG		
3606	⑦ 1-2-3 for Mac	329.
3604	⑦ 1-2-3 for Mac Competitive Upgrade	89.
★ Mainstay ... 30 day MBG		
7718	⑦ MacFlow 3.55	185.
★ MECA ... 60 day MBG		
2796	⑦ Managing Your Money 4.0	49.
★ Microlytics ... 60 day MBG		
9729	⑦ Strunk & White's Elements of Style	34.
7820	⑦ Random House Encyclopedia 1.0	68.

there stands a cafe,



★ Microsoft ... 30 day MBG

3669 ⑦ Excel 4.0—Excel has led in ease-of-use and design innovation since 1985. It's powerful, and remarkably feature-rich—just the way an award-winning spreadsheet should be... \$295.
5237 ⑦ Excel 4.0 Upgrade. 99.

★ Microsoft ... 30 day MBG

2884 ⑦ Works 2.00E 155.
3669 ⑦ Excel 4.0 (May '92) 295. 5237 Upgrade 99.
4902 ⑦ Word 5.0... 295. 1503 ⑦ Upgrade... 125.
5454 ⑦ The Microsoft Office 2.5 (May '92)... 475.

★ Niles & Associates ... 30 day MBG

5048 ⑦ EndLink 1.1.3 58. 4602 ⑦ EndNote 1.4 85.
8010 ⑦ EndNote Plus 1.2 (Apr. '92)... 145.

★ Nolo Press ... 30 day MBG

4228 ⑦ For the Record 2.0 30.
2981 ⑦ WillMaker 4.0 (not valid in LA.) 35.
1204 ⑦ Living Trust 1.0 45.

★ OCCAM Research Corporation

3697 ⑦ MUSE 1.0 469.

★ Paragon Concepts

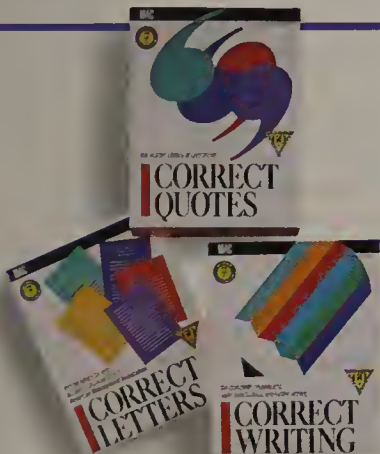
5683 ⑦ Nisus 3.06. 238. 1612 ⑦ Compact 3.3. 93.

★ Pastel Development ... 30 day MBG

1785 ⑦ DayMaker 1.01 61.

★ PC Globe, Inc.

3608 ⑦ Mac USA 35.
3356 ⑦ MacGlobe 1.0 46.



★ Wordstar ... 30 day MBG

5281 ⑦ Correct Writing, Quotes, and Letters—Express your thoughts more fluently with these three programs designed to help you analyze & enhance your writing, compose better business letters, & enable you to quote notables... \$75.

★ Portfolio Systems ... 30 day MBG

7992 ⑦ DynoPage 1.7 or 6916 ⑦ Dynodex ea. \$72.

★ PowerUp ... 30 day MBG

7696 ⑦ Calendar Creator 1.01 44.
7694 ⑦ Address Book Plus 2.01 63.

★ Provue ... 60 day MBG

4582 ⑦ Panorama II 2.0.5 239.

★ Que Corp. ... 30 day MBG

7482 ⑦ RightWriter for the Mac 3.1 54.

★ Realty Technologies ... 30 day MBG

6929 ⑦ WealthBuilder 1.02 95.

★ Reference Software ... 30 day MBG

6268 ⑦ Grammatik Mac 2.0 58.

★ Round Lake Publishing

9946 ⑦ LetterWorks, 9945 ⑦ SALES LetterWorks, or 9947 ⑦ LEGAL LetterWorks ea. 45.

5473 ⑦ Professional LetterWorks 51.

★ Shana ... 30 day MBG

8810 ⑦ Informed Mgr. 99. 7692 ⑦ Designer. 159.

★ SoftSync, Inc. ... 30 day MBG

7129 ⑦ Accountant, Inc. 335. 3828 MultiUser 569.

★ Software Toolworks

8366 ⑦ Dollars & Sense 5.0 59.

★ Spyglass ... 60 day MBG

2027 ⑦ Transform 2.1 or 2028 ⑦ Dicer 1.1 ea. 399.

★ Survivor Software ... 30 day MBG

3289 ⑦ MacMoney 3.52 58.

★ Symantec ... 60 day MBG

2237 ⑦ GreatWorks 2.0. 199. 2278 Upgrade. 99.
3422 ⑦ More 3.1 265.

★ Symmetry ... 30 day MBG

3131 ⑦ Acta 7 1.0 75.

★ Synergy ... 30 day MBG

6617 ⑦ KaleidaGraph 2.1.3 150.

★ Teleware ... 30 day MBG

7616 ⑦ M.Y.O.B. 3.0 (Apr. '92) 138.

★ TIMESLIPS ... 30 day MBG

2986 ⑦ Timeslips III 2.1 194.

★ T/Maker ... 30 day MBG

3639 ⑦ WriteNow 3.0 (May '92) 149.

5259 ⑦ WriteNow 3.0 Upgrade 49.

5253 ⑦ WriteNow 3.0 Competitive Upgrade... 69.

3508 ⑦ The PowerBundle (with carry case)... 159.

★ Williams & MacIsaac ... 30 day MBG

4976 ⑦ StickyBusiness 1.5 51.

6926 ⑦ myDiskLabeler III 3.1 42.

★ WordPerfect ... 60 day MBG

3800 ⑦ WordPerfect Mac 2.1 279.

3090 ⑦ WordPerfect Office 3.0 (single) 89.

3092 ⑦ WP Office (5 pack) 295. 3088 (20 pack) 895.

★ Wordstar ... 30 day MBG

3554 ⑦ American Heritage Dictionary 55.

6984 ⑦ Correct Grammar 3.01 55.

5281 ⑦ Correct Writing, Quotes, & Letters... 75.

★ Wyoming Software ... 30 day MBG

3555 ⑦ Business Sense 1.5 124.

GRAPHICS & DESIGN PUBLISHING, PRESENTATIONS

★ Abracadata, Ltd. ... 30 day MBG

9995 ⑦ Instant Decorator 1.1 29.

9990 ⑦ Design Your Home - Architecture, 9992 Interiors, or 9994 Landscape... ea. 63.

★ Adobe Systems

8794 ⑦ Adobe Type Library (Vol. 1-260) call

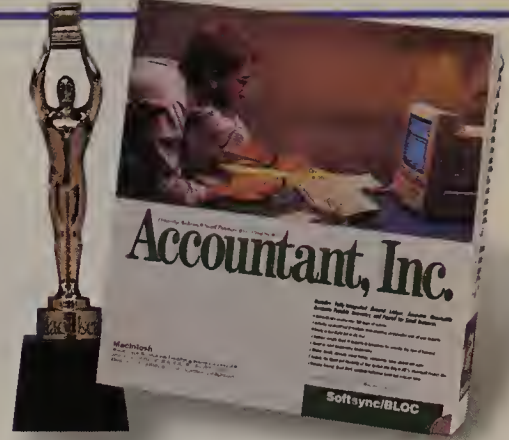
6957 ⑦ Adobe Type On Call (CD-ROM) 56.

5750 ⑦ Adobe Type Reunion 1.0.2 41.

6053 ⑦ Adobe Type Manager 2.0.3 59.

6156 ⑦ Adobe Plus Pack 2.0 118.

6156 ⑦ Adobe Plus Pack/ATM 175.



★ SoftSync, Inc. ... 30 day MBG

7129 ⑦ Accountant, Inc. 3.0—1991 MacUser Editors' Choice Award for Best Accounting Package. "The most complete integrated accounting and financial mgmt. package," MacUser (3/91). \$335.
3828 ⑦ Accountant, Inc./MultiUser 1.0 569.

6098 ⑦ TypeAlign for ATM 1.0.4 61.
5001 ⑦ Streamline 2.0 122.
4145 ⑦ Adobe Premiere 1.0 305.
8171 ⑦ Adobe Illustrator 3.2 (with ATM) 368.
6644 ⑦ Adobe Photoshop 2.01 548.
6671 ⑦ Adobe Type Set 1 or 6677 ⑦ Type Set 2 62.
7587 ⑦ Adobe Type Set 3 125.

Adobe Type Sets for Business:

2221 ⑦ Letters, Memos & Faxes 95.
2223 ⑦ Invitations & Awards 95.
2219 ⑦ Spreadsheets & Graphs 95.
2222 ⑦ Overheads & Slides 95.

★ Aldus ... 30 day MBG

6674 ⑦ Aldus Personal Press 1.01 109.

2461 ⑦ Aldus Gallery Effects 1.0 128.

3506 ⑦ Aldus SuperPaint 3.0 132.

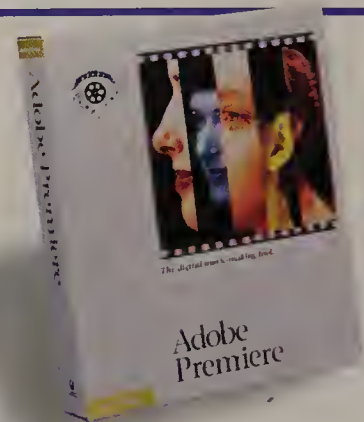
3980 ⑦ Aldus Digital Darkroom 2.0 259.

3507 ⑦ Aldus Super 3D 2.5 325.

4751 ⑦ Aldus Persuasion 2.1 325.

1330 ⑦ Aldus FreeHand 3.1 394.

7088 ⑦ Aldus PageMaker 4.2 494.



Adobe Systems

4145 ⑦ Adobe Premiere 1.0—Easily combines video footage, audio recordings, animation, still images and graphics to create high-quality digital movies. Takes advantage of Apple's QuickTime media-integration technology... \$305.

With a cook who's



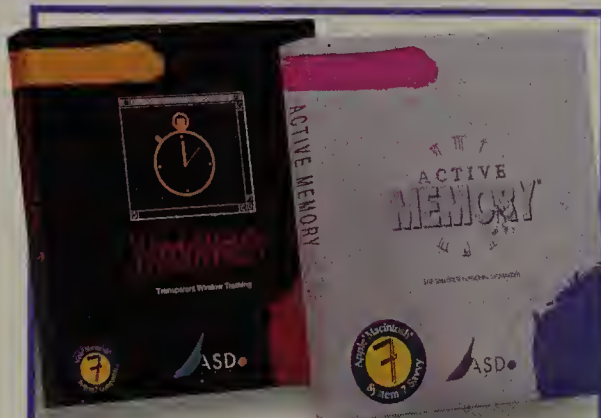
★ **Expert Software ... 30 day MBG**
4870 ⑦ *Expert Color Paint 1.0*—New! The latest in painting tools at an incredible price. You get hot 32-bit color, image editing, and tools that may be customized, anti-aliasing, virtual memory and System 7 support \$29.

- Altsys**
9806 ⑦ *Metamorphosis Pro 2.03* 89.
1983 ⑦ *EPS Exchange 2.0* 89.
1195 ⑦ *Fontographer 3.5* 262.
- ★ **Ares Software ... 30 day MBG**
8878 ⑦ *FontMonger 1.05* 62.
- ★ **Baseline Publishing ... 30 day MBG**
8055 ⑦ *Screenshot 1.2* 34.
- Bitstream**
2249 ⑦ *Type Treasury CD (Type 1 & True Type Fonts)* 45.
⑦ *Type Essentials (coordinated collections)* call
- Broderbund Software**
3572 ⑦ *Kid Pix 1.2* 34.
1427 ⑦ *The Print Shop 1.3.2* 35.
6281 ⑦ *TypeStyler 2.0 (with ATM)* 126.
- ★ **Casady & Greene ... 30 day MBG**
8879 ⑦ *Fluent Font Library 4.05* 99.
1945 ⑦ *True Type Starter Set* 57.
- ★ **Claris ... 30 day MBG**
1123 ⑦ *MacPaint 2.0* 86.
2518 ⑦ *MacDraw Pro 1.01* 275.
8007 ⑦ *Claris CAD 2.0* 599.
- Custom Applications**
8037 ⑦ *Freedom of Press Light 3.03 (17 fonts)* . 84.
- ★ **DeltaPoint ... 60 day MBG**
3558 ⑦ *DeltaGraph Pro 2.0* 199.
- ★ **Deneba Software ... 30 day MBG**
3227 ⑦ *Canvas 3.02* 248.



★ **Casa Blanca Works ... 30 day MBG**
1593 ⑦ *Drive 7 2.0*—The most versatile & affordable formatter available. Incls. Drive7Rem for SyQuest, Bernoulli, Optical, & CD-ROMs!. \$49.
1573 ⑦ *DriveShare*—Share removable drives under 6.0x or 7.0x! Max your hardware investment. 89.

- ★ **Expert Software ... 30 day MBG**
4870 ⑦ *Expert Color Paint 1.0* \$29.
- ★ **Foundation Publishing ... 60 day MBG**
9438 ⑦ *Comic Strip/People & Kid Stuff* 71.
- Fractal Design**
5425 ⑦ *Painter 1.2* 235.
- IDD/Innovative Data Design**
2417 ⑦ *MacDraft 2.1* 279.
- ★ **Letraset ... 30 day MBG**
4709 ⑦ *LetraStudio 2.0 (Apr. '92)* 139.
FontEK Typeface Collection ea. 30.
- Light Source**
3733 ⑦ *Ofoto 1.1.1* 279.
- ★ **Linguist's Software ... 60 day MBG**
Over 100 language fonts call
- ★ **MacroMind•Paracomp ... 30 day MBG**
3148 ⑦ *Magic* . 275. 5028 ⑦ *ModelShop II* . 619.
7441 ⑦ *Swivel 3D Professional 2.0* 479.
3450 ⑦ *SwivelMan 1.0* 619.
- ★ **Mainstay ... 30 day MBG**
9798 ⑦ *Capture 4.0* 82.
- ★ **MicroFrontier ... 30 day MBG**
3013 ⑦ *Color It! 2.0 (May '92)* 73.
- ★ **MicroMaps ... 30 day MBG**
7556 ⑦ *MapArt (PICT) or 7555 (EPS)* ea. 89.
2791 ⑦ *Global Perspectives* 25.



★ **ASD Software ... 30 day MBG**
5313 ⑦ *Active Memory 2.0*—Personal Info. Mgr. for network usage, sharing reminders, etc. \$125.
2552 ⑦ *WindoWatch*—A window tracking utility that generates a time sheet in the background over a LAN 93.

- ★ **Microsoft ... 30 day MBG**
2878 ⑦ *PowerPoint 2.01E* 245.
- ★ **Monotype Typography ... 30 day MBG**
⑦ *Monotype Imprints-TrueType* ea. 22.
Classic Fonts (full line available) call
- Postcraft International**
2210 ⑦ *Effects Specialist 1.04* 89.
2200 ⑦ *Layouts PageMaker or 2414 QuarkXPress* 69.
- Quark**
7612 ⑦ *QuarkXPress 3.1* 569.
- ★ **Specular International ... 30 day MBG**
4962 ⑦ *Infini-D 1.1* 647.
3543 ⑦ *Replicas (vol. 1) or 3675 (vol. 2)* .. ea. 189.
- ★ **Spinnaker ... 30 day MBG**
3530 ⑦ *Certificate Maker 2.02* 22.
- Strata**
7773 ⑦ *Stratavision 3D 2.5* 629.
- ★ **SuperMac Technology ... 60 day MBG**
3380 ⑦ *PixelPaint 2.1* . 149. 5625 ⑦ *Pro* . 459.
- 3G Graphics**
6379 ⑦ *Accents & Borders 1* 63.
4583 ⑦ *Business 1* . 63. 2003 ⑦ *People 1* . 94.
- ★ **Timeworks ... 30 day MBG**
7115 ⑦ *Publish It! Easy 2.1 with File-It!* 145.
- ★ **T/Maker ... 30 day MBG**
⑦ *ClickArt (7 bitmapped)* ea. 38.
⑦ *ClickArt (5 EPS formats)* ea. 82.
1858 ⑦ *FaxMania (birthdays to bulletins)* 29.



★ **Virtus Corporation ... 30 day MBG**
4488 ⑦ *WalkThrough 1.03*—Award-winning 3D drawing program. Includes real-time 3D presentations, QuickTime and PICS animation movies, and perspective pictures as well as data exchange capabilities \$309.

★ **Virtus Corporation ... 30 day MBG**
4488 ⑦ *WalkThrough 1.03* 309.

PROGRAMMING UTILITIES, HYPERCARD, SECURITY

- ★ **Abbott Systems ... 30 day MBG**
2515 ⑦ *Calc+ 1.0* 39. 5236 ⑦ *CanOpener 2.0* 62.
- ★ **Advanced Software ... 30 day MBG**
8051 ⑦ *Intouch 1.1* 39. 9986 *Network (3-Pak)* 112.
- After Hours Software**
1352 ⑦ *TouchBASE 2.0.1* 79.
3314 ⑦ *DateBook (Apr. '92)* 79.
- ★ **Aladdin Systems ... 30 day MBG**
6740 ⑦ *StuffIt Deluxe 3.0 (May '92)* 55.
- ★ **Aldus ... 30 day MBG**
5100 ⑦ *Aldus SuperCard 1.6* 195.
- ★ **ALSoft ... 30 day MBG**
9808 ⑦ *MasterJuggler 1.57* 25.
9807 ⑦ *DiskExpress II 2.11* 49.
5204 ⑦ *ALSoft Power Utilities 1.0* 69.
- ★ **Alysis Software ... 30 day MBG**
2687 ⑦ *SuperDisk!* 49.
1608 ⑦ *More Disk Space* special 42.
- Apple Computer**
1074 ⑦ *System 7 (with free PCTV video)* 99.
- ★ **ASD Software ... 30 day MBG**
5 & 10 users packs available.
7085 ⑦ *FileGuard 2.7 (1 user)* 138.
5313 ⑦ *Active Memory 2.0 (1 user)* 125.
2552 ⑦ *WindoWatch (1 user)* 93.
- ★ **Baseline Publishing ... 30 day MBG**
7783 ⑦ *INIT Manager 1.1* 33.
3114 ⑦ *INIT Info Pro* 39.
- ★ **Berkeley Systems ... 30 day MBG**
5737 ⑦ *After Dark 2.0V* 28.
2198 ⑦ *More After Dark (M.A.D.)* 23.
2196 ⑦ *After Dark & M.A.D. Bundle* 40.
- ★ **Casa Blanca Works ... 30 day MBG**
1593 ⑦ *Drive 7 2.0* 49.
1573 ⑦ *DriveShare (Apr. '92)* 89.
- ★ **Casady & Greene ... 30 day MBG**
2269 ⑦ *QuickDEX 2.3* . 22. 2528 (5 Pak) . 99.
- ★ **CE Software ... 60 day MBG**
1727 ⑦ *CalendarMaker 3.0.1* 31.
6278 ⑦ *DiskTop 4.01 or 3376* ⑦ *Tiles 1.01* 63.
7518 ⑦ *Alarming Events 1.03* 84.
8024 ⑦ *QuickKeys 2.11* 93.
1565 ⑦ *QuickKeys 2 (10 user)*. 749. 1561 (50). 2799.
- ★ **Central Point ... 30 day MBG**
5041 ⑦ *Mac Tools Deluxe 1.2* 79.
- ★ **Claris ... 30 day MBG**
8734 ⑦ *HyperCard Development Kit 2.1* 139.

there every day.



After Hours Software

1352 **TouchBASE 2.0.1**—Multi-user database designed to keep track of personal and business contacts. It's a handy desk accessory that can print envelopes, labels, address books, fax cover sheets, reports and much more. \$79.

★Connectix ... 30 day MBG

7830 **Maxima 2.0.1** 45.
6647 **HandOff II 2.2.1** 55.

★Dantz Development ... 30 day MBG

3393 **DiskFit Pro 1.0** 74.
5255 **Retrospect 147. 7945** **Remote 1.3** 264.
7946 **Remote (10 Pak)** 147. 3112 **(50 Pak)** 649.

Dubl-Click Software

6653 **MenuFonts 4.0** 44.
7974 **ClickChange 1.05.2** 56.

★ElseWare Corp. ... 30 day MBG

4871 **Checklist 2.0** 89.

★Fifth Generation ... 30 day MBG

4287 **PYRO! 4.01** 27.
3955 **Suitcase II 2.0** 53.
8286 **SuperLaserSpool 3.0** 99.
5178 **FastBack Plus** or 5725 **DiskLock** ea. 125.

★FWB, Inc. ... 30 day MBG

2999 **Hard Disk Toolkit 1.1** 125.

★ICOM Simulations ... 30 day MBG

3731 **OnCue II 2.0** 56.

★Insight Development ... 30 day MBG

6171 **MacPrint 1.3** 92.

★Kensington ... 30 day MBG

9301 **PassProof (right)** 65. 9300 **(left)** ea. 65.
2011 **PP Classic** or 1632 **PP IIsi** ea. 65.

★Kent Marsh Ltd. ... 30 day MBG

9513 **FolderBolt 1.02** 73.
1839 **The NightWatch II (Apr. '92)** 89.

★Kiwi Software ... 60 day MBG

6267 **Kiwi ENVELOPES! 3.1.5** 32.
3518 **Kiwi POWER WINDOWS** 50.

★Magic Software ... 30 day MBG

7267 **AutoSave II** or 7268 **POWERicons** 26.
7270 **Backmatic 2.01** 50.

★Microcom ... 30 day MBG

4803 **Virex/Mac** 57. 5885 **(10 user)** 399.
8561 **911 Utilities** 89.
2462 **Citadel with Shredder** 89.

MicroMat Computer Systems

3732 **MacEKG II (Apr. '92)** 110.

★Microseeds Pub. ... 60 day MBG

7068 **INITPicker 2.02** 34.
2913 **Redux 1.63** or 2936 **HAM** 49.

★Microsoft ... 30 day MBG

4471 **QuickBasic 1.0** 64.

★Nine to Five Software ... 30 day MBG

9767 **Reports 2.1** \$94.
2832 **Attributes 2.0** 50. 2835 **Search 2.0** 62.

★Now Software ... 30 day MBG

1793 **Now Up-To-Date 1.0** 65.
2371 **(5 user)** 265. 2366 **(10 user)** 395.
6925 **Now Utilities 3.01** 83.

★ON Technology ... 1 year MBG

6385 **On Location 2.0** 75.
1566 **STATUS+Mac 2.0.2 (unlimited)** 749.

Palomar Software

8210 **PLOTTERgeist 2.0** 249.

★Sallent Software ... 30 day MBG

7404 **DiskDoublor 3.7.5** 45.
4838 **AutoDoublor 1.05** 45.

★Symantec ... 60 day MBG

5176 **Symantec AntiVirus for Mac (SAM)** 64.
5724 **Symantec Utilities for Mac (SUM II)** 96.
6748 **Norton Utilities for Mac 2.0** 95.
3421 **THINK Pascal** 165. 2688 **THINK C** 199.
9957 **THINK Reference 1.0** 68.

Teknosys

5203 **HELP! 1.0.1** 89.

★TGS Systems ... 60 day MBG

6667 **Prograph 2.5** 309.



MicroMat Computer Systems

3732 **MacEKG II**—Get to the heart of your Mac. The complete diagnostic utility for all users. It looks at your entire System as a whole and shows you how your System's resources are being used—or abused \$110.

★Thought I Could ... 30 day MBG

4843 **Wallpaper 1.0.1** 37.

UserLand Software

4753 **Frontier** 189.

★Utlitron, Inc. ... 30 day MBG

1340 **TrashMaster 1.0** 39.

★Visionary Software ... 30 day MBG

3888 **Synchronicity 3.0** 35.
3887 **First Things First 2.1** 41.

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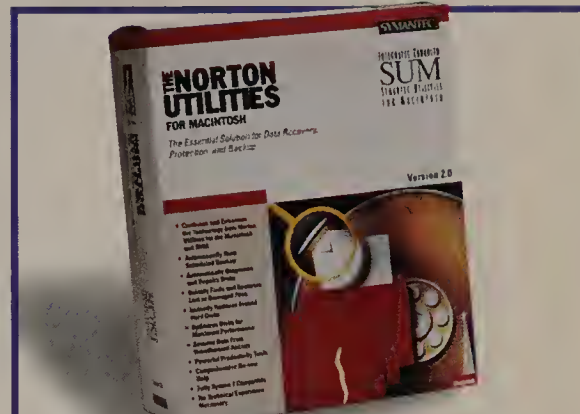
1423 **Hard Ball II** 31.
8220 **Jack Nicklaus Golf** 34.

★Aldus ... 30 day MBG

3503 **Dark Castle 1.1** 34.
3502 **Beyond Dark Castle 1.0** 34.

★Baseline Publishing ... 30 day MBG

7785 **Talking Moose 4.0.2** 22.



★Symantec ... 60 day MBG

6748 **Norton Utilities for Mac 2.0**—New version combines & enhances Norton Utilities & SUM II. Offers fully integrated advanced disk repair and recovery, automatic backup, data security, productivity tools & system enhancements. . . \$95.

★Beacon Technology ... 30 day MBG

4967 **HyperBible (KJV)** or 4968 **(NIV)** . . ea. 125.

Broderbund Software

4314 **Type! 1.0** 18.

6516 **The Playroom 2.0 (CP) (color)** 29.

Carmen Sandiego Series (CP) ea. 29.

5317 **Spelunx and the Caves of Mr. Suedo** 29.

9804 **RoboSport** or 8195 **BannerMania** ea. 35.

3559 **SimAnt** or 5318 **Nigel's World** ea. 35.

8266 **SimEarth 1.1** 40.

4966 **SimCity (CP)** 29. 5871 **Supreme** 47.

★Carla Software ... 30 day MBG

5726 **Voyager 1.2** 87.

★Casady & Greene ... 30 day MBG

4119 **Crystal Quest with Critter Editor 2.2x** 29.

3343 **Aqua Blooper Piper** or 3342 **Glider** 29.

4960 **Fun Bundle (includes Crystal Quest w/CE, Sky Shadow & Mission Starlight)** 59.

★Centron Software ... 30 day MBG

2707 **Puzzle Master** 26.

8525 **Casino Master (B&W)** or 8524 **(Color)** 45.



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9808 **MasterJuggler 1.57**—The indispensable font suitcase and application manager. Quickly access hundreds of True Type and PostScript fonts, plus easily open applications and their documents from a convenient pop-up menu . . \$25.

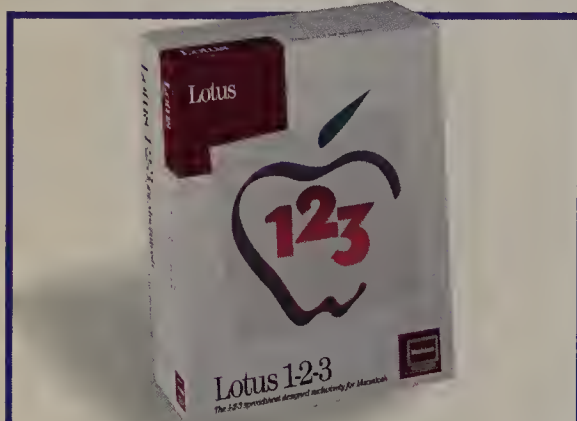
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 3922 ⑦ Talking Spell It Plus \$29.
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 2574 ⑦ New Math Blaster Plus 34.
 8278 ⑦ Alge-Blaster Plus 34.
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EARTHQUEST
 3118 ⑦ EARTHQUEST Ecology 1.0 34.
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 5294 ⑦ Time Treks 1.0 (May '92) 34.
- Electronic Arts**
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 8194 ⑦ Armor Alley 1.1 32.
 1907 ⑦ PGA Golf or 2963 ⑦ Starflight II 1.0 ea. 39.
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 8643 ⑦ Harpoon 39. 2962 ⑦ Challenger Pak 59.
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- Graphic Simulations**
 4756 ⑦ Hellcats Over the Pacific 1.0 39.
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 4334 ⑦ NumberMaze. . 25. 8527 ⑦ (Color). . 35.
 8044 ⑦ NM Decimals & Fractions (Color) 35.



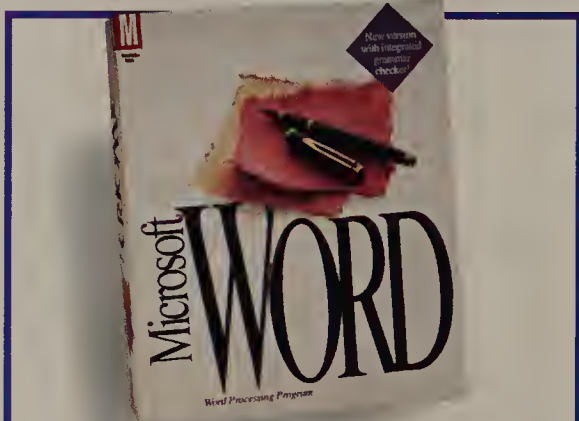
- ★ **Deneba Software ... 30 day MBG**
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 ⑦ Number, Word, or Super Munchers ea. 28.
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- ★ **Microsoft ... 30 day MBG**
 2868 ⑦ Flight Simulator 4.0 (CP) 42.
- ★ **Nordic Software ... 30 day MBG**
 8258 ⑦ Turbo Math Facts 2.0 24.
 8260 ⑦ Word Quest 2.1 30.
 8257 ⑦ PreSchool Pack - Color 1.0 34.
 2716 ⑦ Word Search Deluxe 1.04 34.
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- ★ **Inline Design ... 30 day MBG**
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 7622 ⑦ Darwin's Dilemma 2.0 (Apr. '92) 31.
- Interplay Productions**
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 3534 ⑦ Castles 1.0 (May '92) 34.
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 3272 ⑦ Super Solvers: OutNumbered! 1.0 34.
 3687 ⑦ Super Solvers: Midnight Rescue! 34.
 3281 ⑦ The Writing Center 1.0 51.
- ★ **Lelster Productions ... 30 day MBG**
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- Mallard Software**
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 9733 ⑦ Hoyle's Book of Games II 20.
 2412 ⑦ Rise of the Dragon 34.
 7367 ⑦ Space Quest III 34. 2522 ⑦ Space Quest IV 39.
 3545 ⑦ EcoQuest (May '92) 35.
 2523 ⑦ King's Quest V 39.
 3549 ⑦ Police Quest III (May '92) 39.
 3552 ⑦ Leisure Suit Larry V. 39.
- Slr-Tech Software**
 8229 ⑦ Bane of Cosmic Forge 35.
- ★ **SoftStream ... 30 day MBG**
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 3472 ⑦ Family Cards (Solitaire, Rummy, War) . . 49.
- Software Toolworks**
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 1908 ⑦ World Atlas 1.0 52.
- ★ **Spectrum Holobyte ... 30 day MBG**
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 3017 ⑦ Wordtris 1.0 27.
 3459 ⑦ Falcon 2.2.1 or 8181 ⑦ Vette 1.0 . . ea. 33.



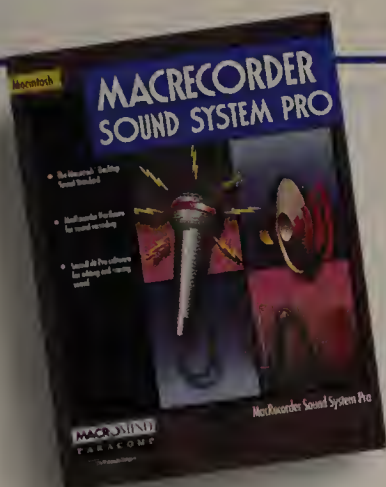
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 ⑦ ACT, GMAT, GRE, or SAT Prep. ea. 29.
- Terrace Software**
 9970 ⑦ Mum's The Word Plus 1.01 (color) ... 107.
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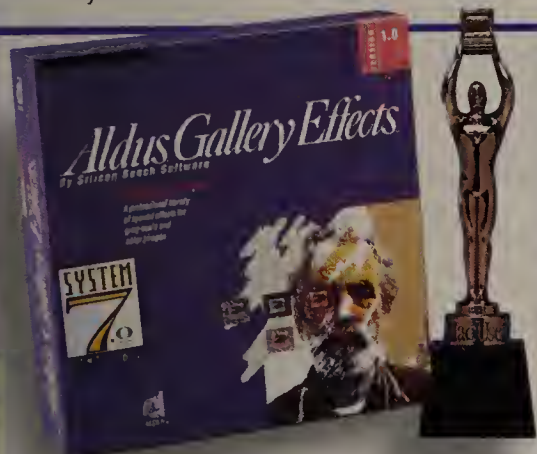
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 2246 ⑦ *MacroMind Three-D 1.0* . . . 999.
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 2592 *QuickImage 24* . . . 249.
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CD-ROM

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 8794 ⑦ *Adobe Type On Call (CD-ROM)* . . . 56.
Broderbund
 3730 ⑦ *Just Grandma and Me (CD-ROM)* . . . 34.
CD Technology
 2321 *CD-ROM Caddy* . 11. 2533 *(5 Pack)* . 49.
 8057 *Porta Drive CD-ROM* . . . 599.
 4140 ⑦ *Multimedia HANDisc* . . . 75.
 ★ **Cyan ... 30 day MBG**
 2717 ⑦ *Cosmic Osmo 1.1 (CD-ROM)* . . . 37.
 ★ **Discovery Systems ... 60 day MBG**
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 3919 ⑦ *AmandaStories CD* . . . 39.

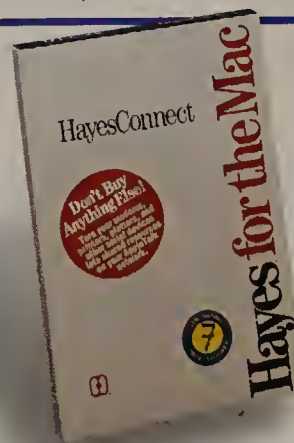
COMMUNICATIONS MODEMS, MAIL, NETWORKS

★ **Abaton ... 30 day MBG**
 6266 *InterFax 24/96 Modem* . . . 289.
 ★ **Applied Engineering ... 30 day MBG**
 8362 ⑦ *QuadraLink (with AE Shadow)* . . . 205.



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 ★ **CE Software ... 60 day MBG**
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 1589 ⑦ *QuickMail (50)* . 1549. 3489 *(100)* . 2899.
 ★ **CompuServe ... 60 day MBG**
 1676 ⑦ *Macintosh Membership Kit 1.6* . . . 25.
 1673 ⑦ *CompuServe Navigator 3.1* . . . 49.
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 ★ **DataViz ... 60 day MBG**
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 4842 ⑦ *MacLink Plus/Translators 6.0* . . . 109.
 ★ **Dayna ... 60 day MBG**
DaynaPORT TRX: (BNC or 10BASE-T) ea. 87.
DaynaPORT E: (10BASE-T) . . . ea. 164.
DaynaPORT E: SE, SE/30, II, IIsi, LC . . 183.
 8719 *EtherPrint* . . 345. 9888 *(10BASE-T)* . . 345.
 3665 *DaynaSTAR MiniHub* . . . 309.
DaynaPORT SCSI/Link: (BNC or 10BASE-T) 279.
 3664 *NetMounter* . . . 57.



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Who knows?

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6758	7 DoveFax 2.0	\$199.	3352 NuBus	\$229.
9634	7 DoveFax Plus	265.	4111 NuBus	299.
4110	7 DoveFax LAN-5	329.	4109 NuBus-5	365.
4796	7 DoveFax LE			365.
5383	7 DoveFax PB (May '92)			199.

★Farallon Computing ... 30 day MBG

Full line available. Partial listing.

9805	7 Timbuku 4.0.2	129.
4866	7 Timbuku/Remote 3.0	129.
6273	PhoneNET StarConnector 10-Pack	129.
4869	PhoneNET Connector 10-Pk (DIN8)	198.
2206	PhoneNET StarController 307	899.
4802	PhoneNET StarController 357	1025.
4814	PhoneNET StarController 377	1299.
9961	PhoneNET Card PC	209.
	PhoneNET Ethernet Card (SE/30, II, si) ea.	173.

★FreeSoft ... 30 day MBG

6115	7 White Knight 11	85.
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★Global Village ... 30 day MBG

8946	7 TelePort A300 1.06	129.
8945	7 TelePort/FAX 1.06	169.
5327	7 TelePort/Full FAX 2.02	219.
5321	7 PowerPort/V.32 2.0	489.

Hayes

5101	HayesConnect 3.0 (modem sharing)	75.
2300	7 Smartcom II for the Mac 3.3B	84.
1345	OPTIMA 24 Modem	155.
3522	OPTIMA 96 Modem	389.
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7557	7 Access PC 1.1	60.
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3229	7 SoftAT 2.5	299.
3441	7 SoftNode 1.0	105.
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5522	Quicktel Xeba M2400X	99.
5525	Quicktel Xeba M9624XV	199.
5524	Quicktel Xeba M9696XV	399.
5523	Quicktel Xeba M1414XV	459.

MASS Microsystems

3655	MASS FM24/96	185.
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★Microcom ... 30 day MBG

7459	7 CarbonCopy Mac 2.0 (single)	59.
1556	7 CarbonCopy Mac 2.0 (unlimited)	179.

★Microsoft ... 30 day MBG

9444	7 Microsoft Mail 3.0 (1-5 user)	269.
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★Orange Micro ... 30 day MBG

2392	7 Orange386 (20 MHz)	1799.
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★Prometheus ... 30 day MBG

8990 7 ProModem Ultima Home Office—V.32bis Ultima with voice feature added at an even lower price, turns your Mac into an answering machine. 14,400 bps data modem with V.42bis/MNP 5 & 9600 bps S/R fax & full voice capability! \$489.

★Practical Peripherals ... 30 day MBG

8994	2400 V.42 bis Modem	125.
7934	PM9600SA Modem 1.26	289.
9849	7 SmartPack 9600 (with Smartcom II)	349.

★Prometheus ... 30 day MBG

2590	7 ProModem 2400 Mini Plus	129.
3832	7 ProModem Remote Plus	225.
4724	7 ProModem Home Office	259.
8990	7 ProModem Ultima Home Office	489.

★PSI Integration, Inc. ... 30 day MBG

5320	7 PowerModem (for PowerBook)	206.
3143	7 COMstation ONE 195.	3142 7 TWO 299.
5340	7 COMstation FOUR	369.
5339	7 TravelCOM (pocket modem)	489.

★Shiva ... 30 day MBG

3444	7 NetSerial 1.35	275.
4347	NetBridge or 4942 7 TeleBridge	409.
	NetModem/E (thick, thin, 10BASE-T) ea.	1679.

Sitka/TOPS

4188	Teleconnector (DIN8)	23.	2230 (10)	189.
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6264	7 TOPS Network 3.1	187.	2419 (3 pack)	249.
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★Software Ventures ... 30 day MBG

3455	7 MicroPhone II 4.0	special	179.
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★Synergy ... 30 day MBG

6618	7 VersaTerm 4.6	90.	6619 7 PRO 3.6	177.
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★TechWorks ... 30 day MBG

1582	7 GraceLAN	285.
1584	7 GraceLAN Corporate	689.



★Berkeley Systems ... 30 day MBG

2198 7 More After Dark (M.A.D.)—Honorable Mention—1991 MacUser Editors' Choice Award for Best Desktop Diversion. 25 new displays. \$23.
5737 7 After Dark 2.0V—Stops screen burn-in. 28.
2196 7 After Dark & M.A.D. Bundle. 40.

1781	7 GraceLAN Update Mgr. Single Zone	\$169.
1782	7 GraceLAN Update Mgr. Multiple Zone	285.
1767	7 GraceLAN Asset Manager	499.
1763	7 Hubworks-8	289.

Ethernet Cards. call

★White Pine Software ... 30 day MBG

3535	7 Mac 240	139.	3541 7 Mac 241	199.
2404	7 Mac 320	99.	2403 7 Mac 330	169.
2400	7 Mac 340	239.	3544 7 Exodus 3.0	199.

★Zoom Telephonics ... 30 day MBG

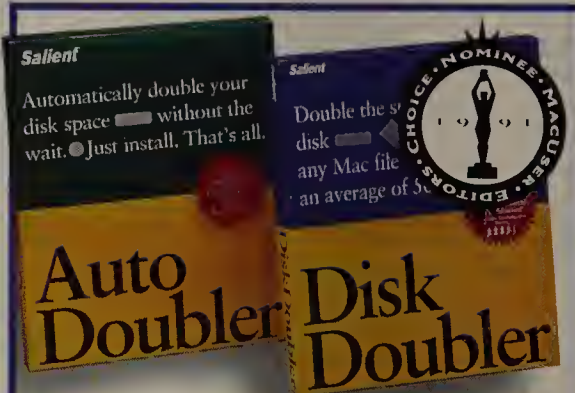
1168	7 MX2400R Modem (w/7 QuickLink II)	69.
1176	7 MX2400S Modem (with SendFax 9600)	79.
2310	7 FX9624 Send/receive Fax/Modem	119.
3576	7 FX9624V Send/receive V.42 Fax/Modem	145.
1179	7 V.42bis Modem (with MacPack)	125.
2311	7 V.32 Turbo Modem (with MacPack)	339.
3553	7 Fax/Modem VFX V.32bis	299.

INPUT/OUTPUT

KEYBOARDS, MICE, TRACKBALLS, PRINTERS & SCANNERS

★Abaton ... 30 day MBG

7432	7 Scan 300/GS (reqs. Scan Kit)	829.
2742	Scan 300/Color (reqs. installation kit)	989.
1496	Inst. Kit for 300/Color with Photoshop	479.
1537	LaserScript LX	1729.



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4838 7 AutoDoubler 1.05—New! Automatically double the space on your drive. \$45.
7404 7 DiskDoubler 3.7.5—Award winner. Compress files for telecommunication, backups, or transfer to floppies. Can use w/AutoDoubler 45.

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9963	7 Gravis Mouse Stick	62.
9964	7 Gravis Super Mouse	79.

American Power

5895	UPS 110SE	209.	6686 UPS 370ci	339.
3447	SurgeArrest Plus			39.

★Appoint ... 30 day MBG

2760	Thumbelina Mac (mini 3 button mouse)	65.
2769	MousePen Pro Mac	65.

Caere

8124	7 Typist Plus Graphics	459.
4476	7 OmniPage 3.0	459.
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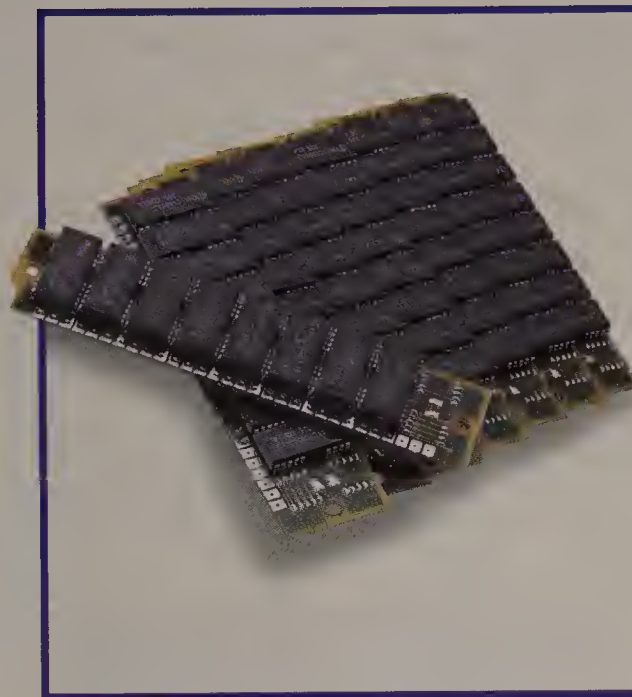
2807	⑦ MicroTRAC (for SE & II family)	75.
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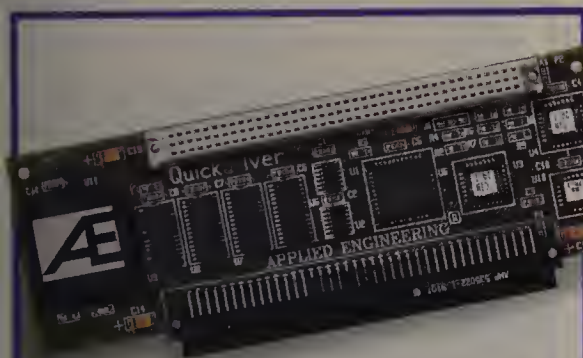
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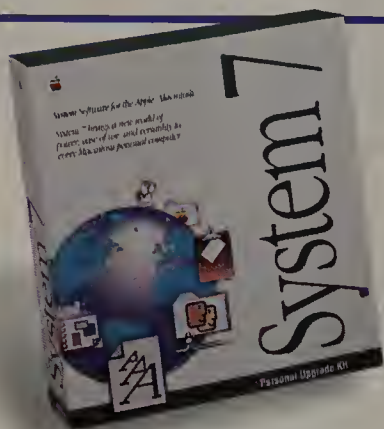
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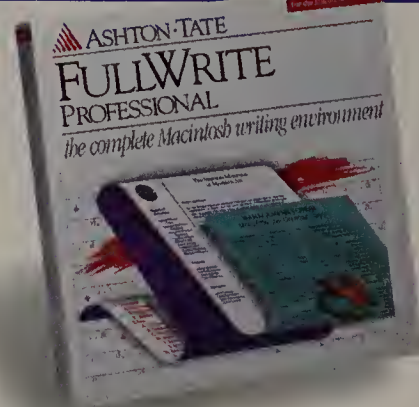
- 8973 Apple Security Kit (SL-2)..... 22.

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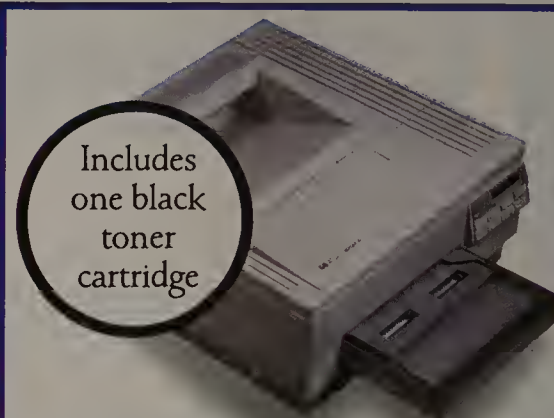
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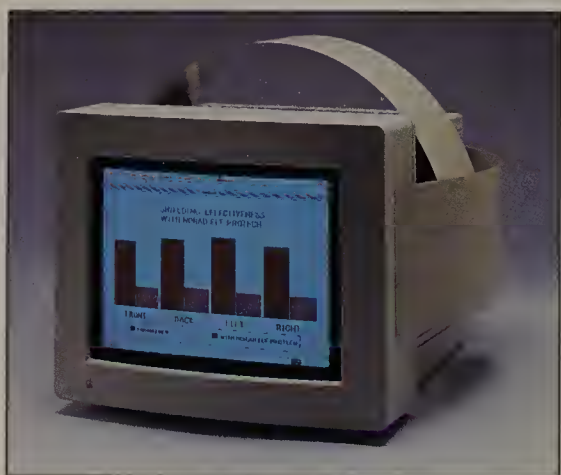
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Monitor Radiation News

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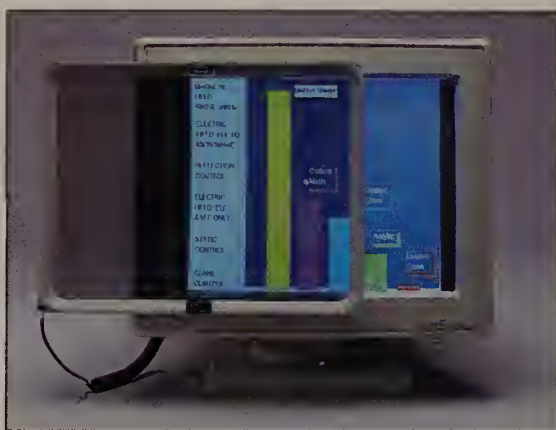
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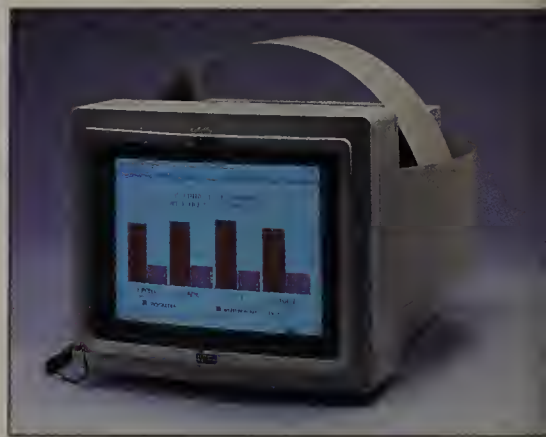
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Art Beat

Behind Macworld's Graphics

BY CATHY ABES

Artist: For the past three years, *Macworld* senior designer Arne Hurty has been creating the detailed, distinctive informational graphics that appear in *Macworld* feature articles and *How To* columns.

Hardware: Macintosh Quadra 700 with 8MB of RAM and 160MB internal hard drive; RasterOps 19-inch color monitor and 24-bit graphics board; Siemens gray-scale scanner; QMS color printer.

Software: FreeHand 3.1.

How It Was Done: For the illustration that opens our feature on alternative input devices, Hurty began by doing a pencil sketch, because he felt that an image as complex as a human hand showing muscles, tendons, and bones would be too difficult and time-consuming to draw free-form in a graphics program. Since it was a line drawing without any gray shades, Hurty scanned the sketch and placed it in FreeHand as a 1-bit TIFF rather than as a gray-scale file, so it would take up less memory.

Hurty first placed the original scanned image (on a layer he named Template) for use as a template from which to trace the different layers of the hand—skin, bones, muscles, and tendons. After saving the template, he created another layer for the skin, and with both the Template and Skin layers open, he began tracing the outline of the skin using the pen tool. Hurty used bright magenta for the line color so he could easily differentiate between the traced line and the original. Once the skin was traced and saved, Hurty turned off the Skin layer, and with the Template layer still on, created a new layer for the bones, where he repeated the

same process (again using magenta for the line). Because there were so many tendons, he created two layers for them—one for the top layer of tendons and muscles and a second for the bottom layer.

Finally, he created a layer for the mouse. To draw the mouse in correct perspective, Hurty used a simple technique. He drew two sets of lines from two different vanishing points that originated far off the page. These he used as a guide for defining the boundaries of the mouse.

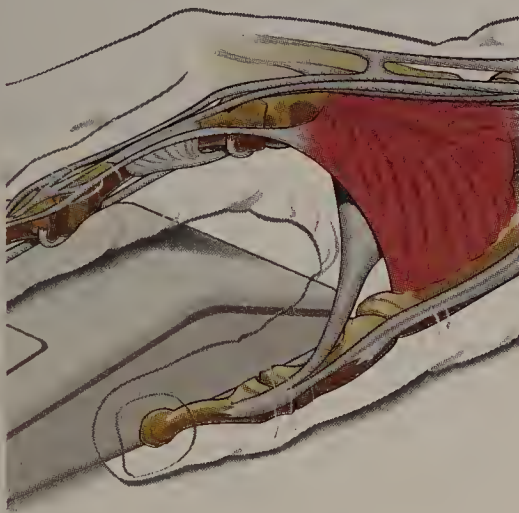
Next he created a set of colors for all the elements of the drawing—the bones, the tendons and muscles, the mouse, and the shadows. Then he applied the colors to the various elements using both solid and graduated fills.

To create the irregularly shaped lines that define most of the elements, Hurty first selected an element—for example, the shape of a bone—copied it to the Clipboard, and (using

⌘-shift-V) pasted it behind the original. Then he gave the pasted image a Basic fill of black, and with all the points of the element still selected, he pulled each point out the desired amount to create a line of irregular width. Because FreeHand's Snap to Point default setting makes it difficult to move points in slight increments and to place points very close to each other without allowing them to touch, Hurty turned it off before he began pulling out the individual points.

Hurty used this technique for all the outlines but varied it slightly for the skin. First he cloned the magenta outline of the skin, and then he slightly repositioned each point of the cloned line, except the end points. He joined the cloned and

continues



Detail of the illustration that opens our feature on input devices, page 154.

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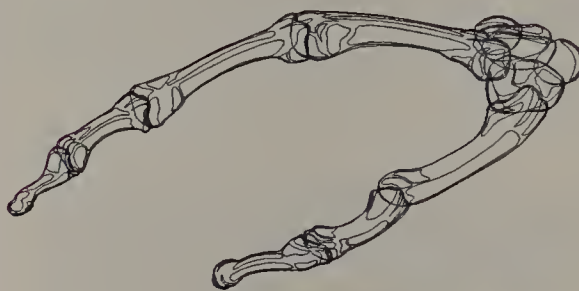
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Hurty used his scanned pencil sketch as a template for tracing the various layers of the illustration (here, the Skin layer) in FreeHand 3.1, using a magenta line to differentiate between the template and the new layer.



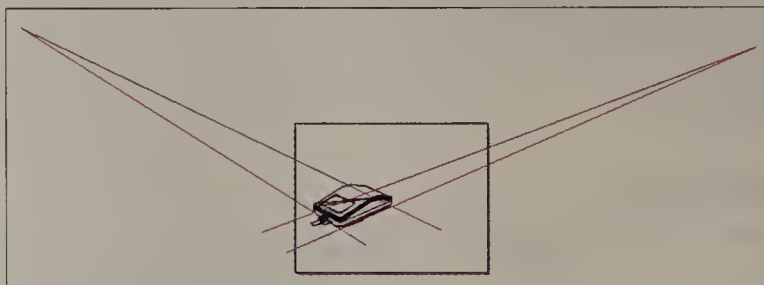
The Bone layer was created by the same process Hurty used to trace the skin. He then colorized the bones by applying a combination of solid and graduated fills.



Hurty created the irregular outlines around the bones (as well as other elements) by pasting a copy of the bone behind the original, giving the copy a black fill, and pulling out each of its points from the original just enough to create an irregular shape.



For the skin, Hurty cloned the magenta line, pulled out all the clone's points except the end points, which he joined to the end points of the original, creating a closed shape. Deleting the line and giving the shape a gray fill resulted in the skin's irregular outline.



To enable him to draw the mouse in correct perspective, Hurty used as guidelines two sets of lines, each set originating from a vanishing point far outside the boundaries of the drawing.

original lines at the end points to create one continuous (closed) element. By deleting the stroke (the magenta outline) and giving the element a fill of gray, he was able to produce a line of irregular width for defining the skin.

Now it was time to create the shadows. Hurty had previously defined each of the shadow colors as tints of black. The colors he selected for all of the other elements were combinations of the other three process colors—cyan, magenta, and yellow. Hurty took this step because he wanted to make sure the shadows would reliably overprint the other elements. If the shadows shared a common color with

the other elements, FreeHand would default to the percentage of common color present in the overprinted area (the shadow), and distort the image. If the shadow contained 20 percent black, for example, and another element contained 60 percent black, 20 percent black would appear in the overlap area—not a color made up of 80 percent black.

Another interesting effect was the one Hurty used to create the ridges in the muscle tissue. He first drew a thin crescent shape and cloned it. Then he pulled the clone's points inward to create an even thinner crescent in the middle of the original. After assigning a light pink to the original and a dark pink to the clone, he created a seven-step blend between the two. When he placed the element on a light pink background—the same color as the original crescent shape, its edges appeared to blend into the background, giving it a smooth, ridged effect. **m**

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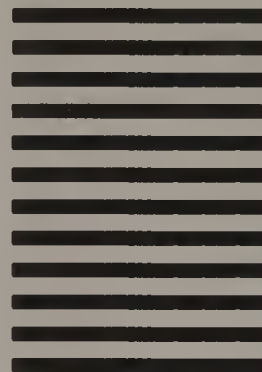
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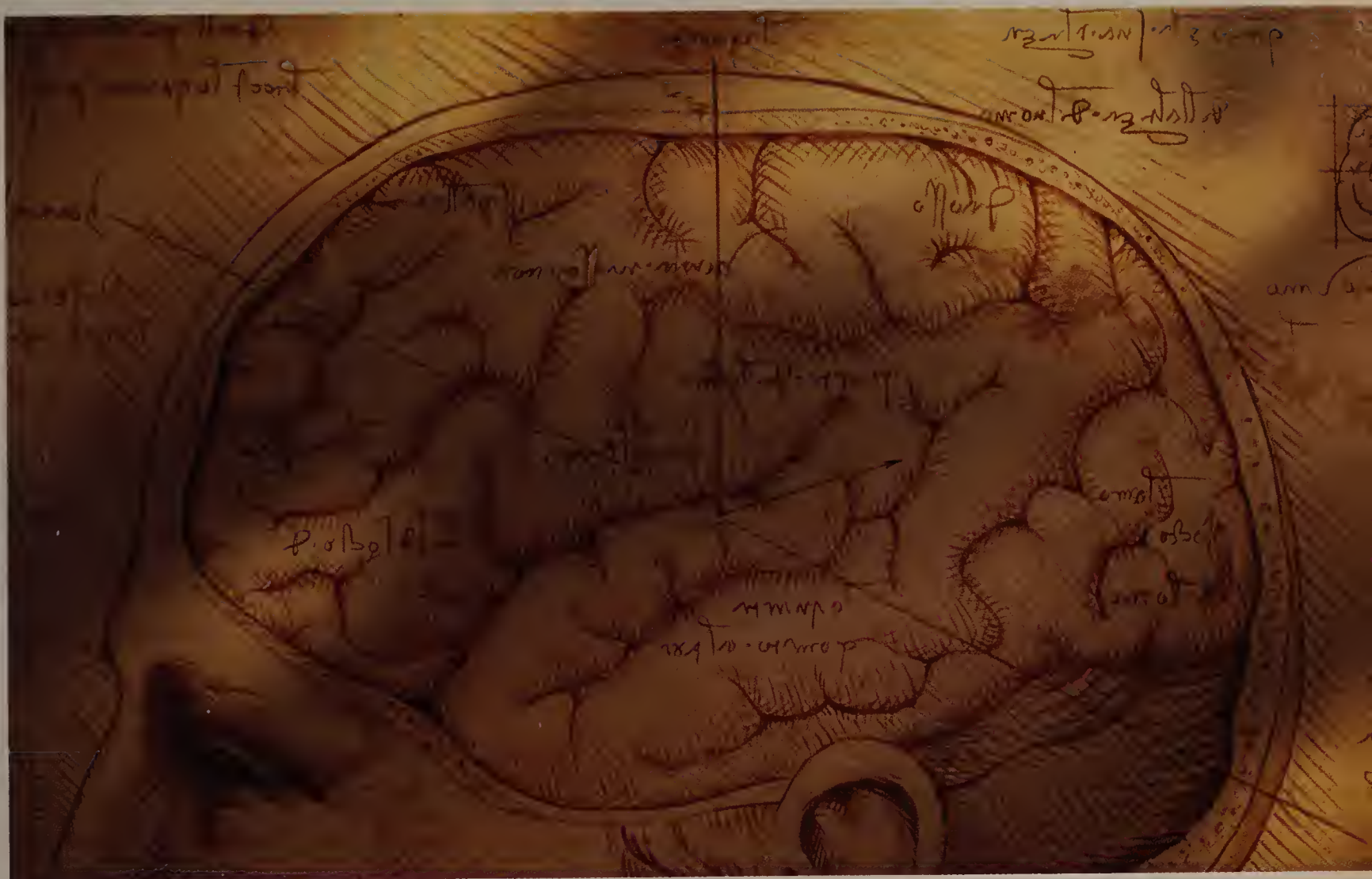
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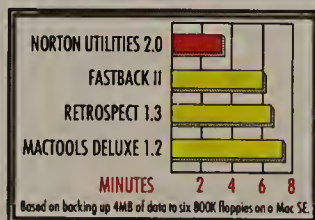
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Claris Redux

BY STEVEN LEVY

DAN EILERS SEEMS TO BE having the time of his life. His face wears the expression of a weekend poker player, finally allowed into a high-stakes match, who just drew an inside straight. Try as he may to prevent it, a giddy smile breaks through. He knows the smile isn't politic, but he's too excited to worry about it.

At least that's the impression I got when we sat down to discuss his nascent reign as president and CEO of Claris, the wholly owned software subsidiary of Apple Computer. After years of toiling at weighty but relatively low-profile jobs at Apple—most notably as the chief purser of the company's strategic investments group, an in-house venture-capital program—Eilers now revels in his new role as software magnate.

When it comes to software written for graphical interfaces such as the Macintosh Operating System, and even Microsoft's Windows environment, nobody does it better than his team, says Eilers. "We're very good at it," he assures me. "The best in the industry at user-centric applications of software." Later, he returns to the subject. "Claris's strength derives from applications software," he says. "We do more on the Mac than any other major player. We are great at it."

If this were a movie, the sound track would be playing one of those stupid pop anthems. Dan and his executive team would be in a lush meadow, a group of business-suited white men tossing the familiar blue-and-white Claris boxes to each other in slow motion. Somewhere, in a dark tower, Bill Gates would be clutching his chest in pain.

At this point, such a movie would have to be rated as fantasy-science fiction. At least, that's the word from Eilers's competitors. Whereas once the name Claris sent software developers into apoplectic stuttering fits, something new has crept into their reactions: a relative ennui, or even dismissive laughter.

The overwhelming sentiment of the executives of the developers I spoke to—tellingly, a sentiment not expressed on the record—was that a competent Claris would indeed be a troublesome competitor, given that Apple's ownership gives the

playing field an inevitable tilt. But—and here's the rub—they don't seem to regard Claris as competent.

On the contrary, they seem to think that Claris is a joke. "Why worry about Claris?" I was told. "It's doing such a good job of destroying itself!"

Claris and Hubris

APPLE STARTED CLARIS IN 1987, WHEN several executives, among them Dan Eilers, urged the company to set up a division specifically to create great applications for the Macintosh. To placate the fears of those third-party developers who had kept the Mac in business by already creating great applications for the Macintosh, Apple decreed that the new company would have its own identity, would receive no special favors, and would, at the soonest opportunity, be spun off as an independent entity in which Apple would hold but a minority share. A management team was appointed, led by Bill Campbell, a gung-ho marketing type who informed me early in his tenure that Claris was destined to become the number one software company in the Mac marketplace.

Most big software companies start by creating a great product, growing with it, and spending the rest of their lives trying desperately to repeat their first big success before they milk the last ounce of gold from it. Claris was different. It began with unheard-of resources, a list of solid if underexploited applications, and the clout of its parent company. It was a multimillion-dollar company without trying.

Eventually Campbell and company earned the respect if not the awe of the industry by setting up the workable infrastructure of a major software operation, as well as establishing an identity for Claris independent of Apple's. But though it proved capable of using its fat coffers to acquire products, Claris never did develop any killer applications in-house. And it never even came close to knocking off Microsoft as the leader in Mac software, which many still believe was Claris's mission. The initial gripes of some of

the competitors faded as they realized that Claris, while formidable, was in no way destined to bulldoze its way to domination. Anyway, they assumed, soon the company would be independent and that whole sticky problem would go away.

But in June 1990 Apple dropped a bombshell. Claris was *not* going public. Apple decreed that Claris would hereafter be a permanent, wholly owned subsidiary—Apple's official software wing.

"It really was a rethinking of the entire situation," explains Al Eisenstat, Apple's chief legal officer and a board member of both companies. "Software operations played strategically into Apple's long-term plans. We realized that if we spun Claris out, we'd need to start a new Claris."

Two groups of people were unhappy with this. First were the Claris executives, potential shareholders in an independent company. No independent public offering meant that they would not be visiting the Ferrari dealerships quite yet. Apple, which has never had a problem with tossing small fortunes into the hands of its executives, tried to soothe the souls of Campbell and his top guns with millions of dollars in consolation prizes. But the disappointment stuck. Instead of being on their own, the Claris folks were wholly owned, permanently, by a company whose corporate credo was reorganization and confusion.

Within a year, the entire complement of top executives found reasons to leave. Few who witnessed it will forget the comical spectacle in the summer of 1991, when Claris held a press conference to introduce its new ClarisWorks integrated product. Before the demo, about a dozen members of the company's executive staff were introduced—and the most senior member of the group had been there only a few weeks. Not long after, in what current Claris vice president of product development Dick Mathews calls a ripple effect, the next level of management began trickling away, and months after that, some of

continues



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the programmers. Some projects were nearly gutted. For instance, the team creating the long-overdue MacWrite Pro lost its engineering manager, the program's chief architect, and its boss.

Profit Motive

THE OTHER UNHAPPY BUNCH CONSISTED of companies competing with Claris. They were quick to note the flaw in Apple's logic: if it was necessary in 1987 to promise to spin off Claris to preserve

fair competition, what had changed in 1990? What had changed was this: Apple was less beholden to its software developers. With the Macintosh a more proven success than ever, Apple figured the presence of its own software company would not keep potential developers away, and it certainly wouldn't force current developers to give up on the Mac. As long as Apple didn't give Claris egregious favors, it figured that people would pipe down.

Indeed, they did. Even Microsoft's ex-

ecutive vice president of worldwide products, Mike Maples, who says he watches out for those things, notes no special advantages doled out by Apple to its offspring. "Generally I've taken the position that it's not fair yelling 'Wolf!' until you see a wolf," says Maples. "To date, we haven't seen a wolf."

At least one competitor, however, says he's spotted one. Mark Simonsen, president of Beagle Bros, complains that Claris's assured access to Apple products is unfair to smaller developers. "We couldn't get a PowerBook to test our software on until the computers were already announced," he says.

But in my conversations with several other Claris competitors, I find such complaining rare these days. Instead, the gleeful word in the industry is that no one needs to worry about Claris, because Apple is screwing things up.

What evidence do these off-the-record bad-mouthers offer? First, Dan Eilers. They consider him a lightweight with little experience in the nuts and bolts of the software business. Then they note Apple's endemic propensity for destructive directional shifts—surely, they say, the presence of the Apple bureaucracy will hamper Claris's ability to respond to the twists and turns of the marketplace.

Finally, they howl with mirth at Claris's premiere in the Windows world with the presentations application called Hollywood, which is generally regarded as a dog. Anyway, why would Windows users buy their software from Apple? Would Macintosh devotees flock to IBM if the company started selling word processors for the Mac?

Give 'Em a Break

TO BE SURE, CLARIS-BASHING IS FUN. It's even more fun after hearing Eilers boast about the brilliance of his company's software, when in fact every one of the major Claris applications was inherited from Apple or purchased from outside developers. But I can only bash so far. Behind Eilers's bravado there's a lot of sense. Not to mention the multibillion-dollar company that makes the computer that runs the software.

For one thing, Apple has wisely decided that Claris should be run as a profit-making organization. Eilers says he has but one mandate: to turn a profit for his division. "There are only two profit centers at Apple," he explains. "One is run by Mike Spindler and has \$7 billion in revenues, and the other is run by me and [reportedly] has \$100 million in revenues." While the latter seems puny compared to the former, that Claris now lives by its *continues*

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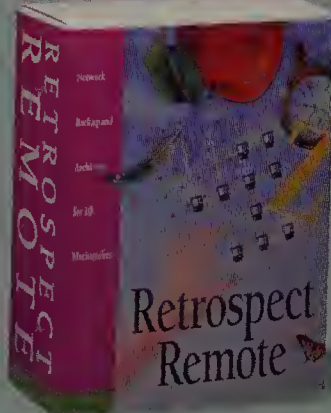
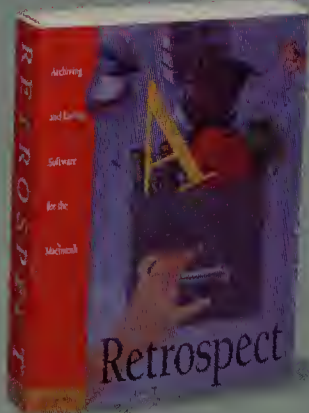
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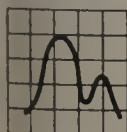
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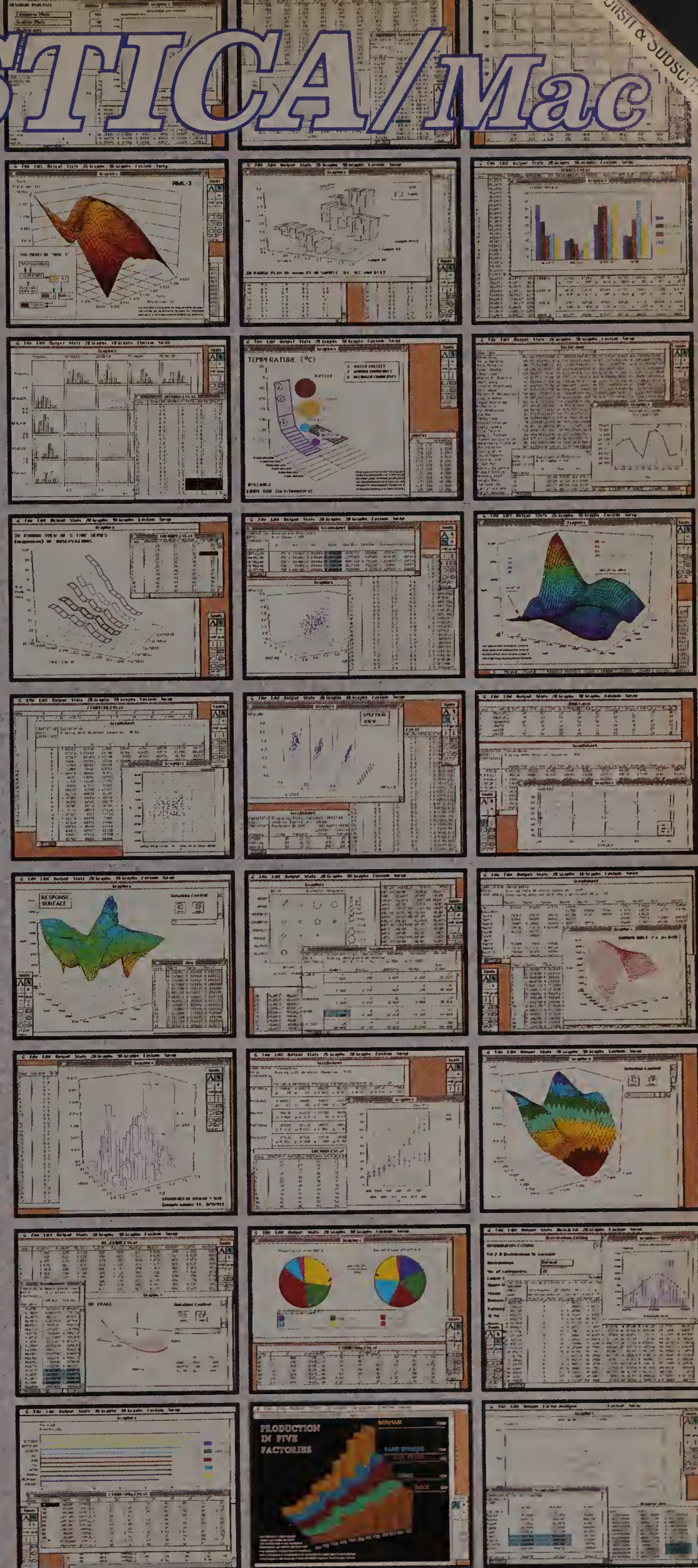
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bottom line can provide a necessary focus not present in all divisions of Apple.

Eilers also has a grand plan. First, Claris intends to rewrite all of its programs, tailoring them to fit on a single core of object-oriented coding that will allow for advanced scripting abilities between the applications. This will also translate to the Claris applications now being readied for other operating systems—in these post-IBM-Apple-agreement days, Claris can now develop soft-

ware for Windows and no one raises an eyebrow. Eilers promises two more Windows applications by the end of the year, and also reveals that Claris is seeking budding new operating systems on which to write applications of the future. As Eilers puts it, "In 1992, we'll choose one new hardware paradigm on which to place applications software."

One of those "paradigms" (also known as computers) is bound to come from inside Apple, and here is where Claris has a

true advantage over its competitors. As the official software arm of Apple, Claris sends its engineers all over Cupertino to participate in the big projects. This includes the Apple-IBM collaboration Taligent, Apple's rumored notebook project (called Newton), and even a top-secret General Magic project, in which Apple has a minority stake, and which reportedly will result in a low-cost product sold through consumer channels. Claris's ability to track the development of these systems, and even to affect them so that they will accommodate Claris's specific needs, are valuable assets to the company.

As far as Eilers's leadership is concerned, it's much too soon to dismiss him. He may not have run a software company before, but he knows the back channels and intrigues of Apple politics—and for the leader of Claris, that may be more important than grokking distribution channels. Eilers also has the luxury of learning his job without the pressures of most of his recession-beleaguered competitors—Claris is loaded with resources, has a full complement of existing applications, and has the insider track to the new systems that will drive the applications of the future. And no matter how bad things get, his company has a built-in fail-safe—the Bozo Factor. This assumes that a certain percentage of bozos will always prefer software written by the company that makes their hardware. Thus, even the lamest Claris application will find its way to users blissfully unaware of whizzy alternatives. And a truly competitive application like ClarisWorks will get an extra boost.

If Eilers is smart, he will use these edges. He won't beat Microsoft, but he will deliver a profit that will please his masters. If he doesn't, maybe the next person in charge will do so. Or the next.

When I talked to the guys who began Claris five years ago, I took note of their brash confidence and suggested that they rename the company Hubris. After meeting Dan Eilers, I still think my name fits better. But that doesn't mean that we could, or should, count Claris out, especially not because Apple Computer is bolted into the driver's seat. Apple may have its foibles, but somehow it managed to introduce and sustain something very near to our hearts and pocketbooks—the Macintosh. And, as Claris veep Dick Mathews notes, the Macintosh itself was not a hardware breakthrough, but a software coup. Would it be unreasonable to assume that some success might come from Apple's software arm? **m**

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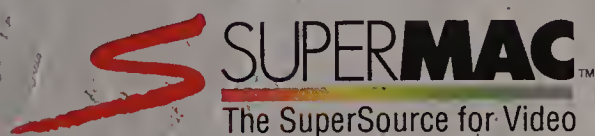
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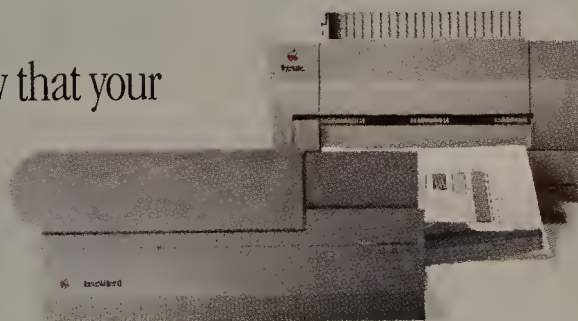
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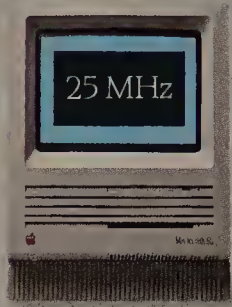
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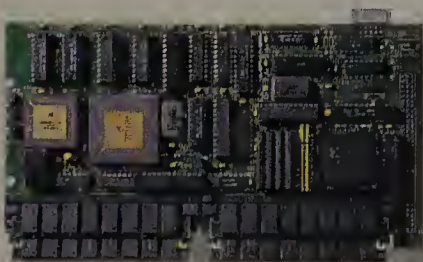
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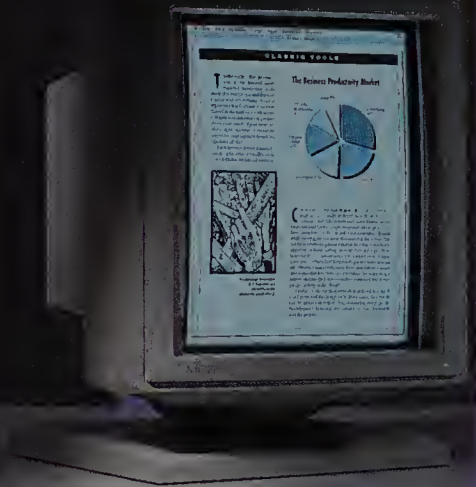
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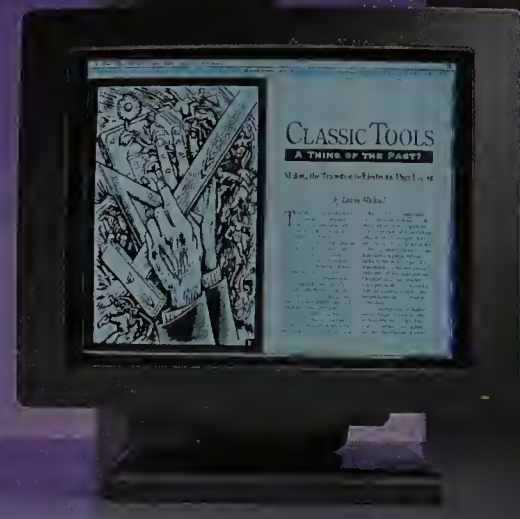
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Special Interests

BY DEBORAH BRANSCUM

WE MAY BE NEARING the end of traditional publishing, but for now, words on paper continue to appeal to a broad audience. In columns past I've covered general-interest books and software helpful to Macintosh users. This time I'd like to steer readers toward selected special-interest publications of note. Some of these periodicals are sold on newsstands; the more expensive ones may be available in public and university libraries.

Computing

MACWEEK, WHICH IS PUBLISHED 44 times a year, is indispensable for following Mac industry news. People who buy (or, perhaps, claim to buy) lots of Macs for their place of employment can get the publication for free; the rest of us pay \$99 for an annual subscription. Call 609/461-2100 for details.

HyperPub is a stylish quarterly for HyperCard developers from former *Dr. Dobb's Journal* editor Michael Swaine. This attractive, 40-page black-and-white newsletter offers a "script lab" and XCMD tutorials every issue and also covers related hypermedia issues. An accompanying floppy disk contains an electronic version of *HyperPub* and other goodies each issue. A four-issue subscription is \$40; mail payment to The Prose Lab, 31 Patrick Rd., Santa Cruz, CA 95060.

Facts on File (212/683-2244) cranks out many useful compilations, including *Software Reviews On File*, which excerpts passages from reviews of microcomputer software printed in nearly 200 publications. An annual subscription is \$215.

NSTL (800/328-2776 in the United States and Canada) publishes the monthly *Software Digest Macintosh Ratings Report*, a 16-page newsletter that compares a different category of business software—such as advanced word processors or spreadsheets—each issue. NSTL is an independent testing group that accepts no advertising in its publications. A 12-issue subscription costs \$202.

The *PC Market Monitor* from Computer Economics (619/438-8100) is a detailed survey of the street prices, used

prices, leasing rates, and relative performance of selected personal computers, monitors, hard drives, printers, and software. It's designed to help Fortune 1000 companies locate dealers with the best prices, but smaller companies will find the info useful as well. Subscribers pay \$395 for a three-ring binder with monthly updates on computer systems and printers. Other hardware and software prices are updated quarterly, as are used computer prices. A dealer section includes mail-order companies and lists open hours, credit card acceptance, and other helpful info.

A less expensive and less detailed alternative to the publication above is *The PC Street Price Index*, a slim 12-page newsletter from Metro Computing. The monthly tracks street prices for a variety of computers, printers, monitors, and software. Contact information for retailers with the lowest prices are included. An annual subscription is \$195; call 609/784-9814 for details.

Shop-till-you-drop types might enjoy *Computer Catalogs*. The \$15.45 paperback from Todd Publications (914/358-6213 or 800/747-1056) describes more than 300 mail-order computer-related catalogs and tells you how to order them.

The MZ Group (415/543-8290, ext. 155) publishes the *Macintosh Services Directory* twice a year. It is a buyer's guide for services such as database programming, user training, user documentation, and technical support. The price is \$21.45; some readers may qualify for a free issue.

DTP and Graphics

THEPAGE CALLS ITSELF "the visual guide to desktop publishing on the Macintosh."

This 20-page black-and-white newsletter carries no advertising but lots of practical information for its readers, most of whom use PageMaker. (Generally one article per issue deals with QuarkXPress.) *ThePage* offers advice on hardware as well as software issues and is one of the most useful publications I've seen for desktop publishers. "The Back Page" column by editor and publisher

David Doty is especially entertaining. (In the May 1991 issue he gave readers a six-point plan for avoiding product-related stress. The points included refusing to upgrade applications, to buy more hardware equipment, or to install System 7. It was a great column, trust me.) A ten-issue subscription is \$65 and includes a booklet called *Basics of Desktop Publishing on the Macintosh*.

Another excellent monthly newsletter, *Step-By-Step Electronic Design*, uses a color layout to offer desktop designers how-to information. A recent issue offered tips on using Adobe Illustrator; discussed making masks in Adobe Photoshop; and explored the additions to PageMaker in version 4.2. Some readers may be acquainted with its sister publication, *Step-By-Step Graphics*, a beautiful how-to magazine that covers both traditional and electronic graphic arts. The January/February 1992 issue, for example, followed one illustrator's work in crafting a digital collage with Adobe Photoshop. Another piece offered 18 techniques for creating digital backgrounds. Subscriptions are priced at \$48 for 12 issues of *Electronic Design* and \$42 for a 6-issue subscription of *Graphics*. Call 800/255-8800 for details.

MacPrePress (fax 203/454-4962) claims to cover "the news that matters on

Mac-based off-the-shelf prepress technology." *Macworld's* in-house DTP guru calls the black-and-white newsletter objective and insightful. Recent topics included the good news and bad news of DTP ("image recording is no longer a major issue," but "large-file movement is a real difficulty"; "color science is no longer an issue," while "trapping is still problematical"). *MacPrePress* is distributed by fax 48 times per year; subscriptions run \$295.

A specialized monthly newsletter tackles technology, journalism, and publishing. *The Cole Papers* follows the triumphs and pitfalls of technology in the newsroom, including new product developments. A one-year subscription runs \$99; request a sample is—



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continues

Service Hero

Reader David Atherton of San Diego was pleased by the service he received from APS. "I spend each year in three different locations—London, San Diego, and Hong Kong," he writes, "and during the past 12 months have ordered some 10 drives from APS on toll-free numbers. Unfortunately, three of the drives developed problems, but in each case a replacement was sent the day the company received my returned drive and, more importantly, they did the paperwork in such a way that there were no delays in customs."

sue from The Cole Group, 2590 Greenwich St., #9, San Francisco, CA 94123.

Education

EDUCATORS PROBABLY ALREADY know about *Syllabus*, but people outside of universities might also be interested in Macintosh development in higher education. The Apple-sponsored quarterly is published by Syllabus Press (408/773-0670). A recent issue traced the history of the Mac in higher education and profiled

development projects at several universities. Subscriptions are free to some professionals (including faculty members and software developers); others pay \$18.

The Computing Teacher, the journal of the International Society for Technology in Education, covers using personal computers in curricula and offers professional techniques. The March issue included one article on a day in the life of a computer specialist and another on using a single computer for instructing an entire class. Call 503/346-4414 or 800/336-5191 for ordering information.

The *Macintosh Education Software Collection* is a catalog, not a magazine, but it may be helpful to teachers who are looking for courseware, administrative software, and shareware to use in their classrooms. Chariot Software Group of San Diego sells software through this catalog, which can be ordered at no cost at 619/298-0202.

Music and Multimedia

READERS WHO WANT TECHNOLOGY with rhythm can find it in *Electronic Musician*. A recent issue examined why so much MIDI-based music sounds bad and included a glossary of electronic-music terms. Call 615/377-3322 or 800/888-

5139 to subscribe. A 12-issue subscription is \$19.95.

Seybold Publications (215/565-2480) has made a name for itself with newsletters on desktop publishing and publishing systems. A fairly recent addition is *Digital Media*, edited by Denise Caruso. It's cogent and lacking in hype, a refreshing change from the usual blather about that arena. Recent topics include electronic books and fractal compression. At \$395, a 12-month subscription is not cheap; a sample issue is available on request.

NewMedia could be considered *Digital Media*'s juvenile counterpart—brash, loud, and not very good yet. Still, it has promise, and there's something endearing about its humor—a list of the top-selling CD ROMs in the year 2000, for example, included Whambi IV: Revenge of the Debauched Dwarf Lizards. Subscriptions run \$36 for 12 issues. Call 609/764-1846 for subscription info.

Offbeat Fun

THE FOLLOWING TWO QUARTERLY glossies defy easy description but trendoids have been reading them for ages.

Verbum, *The Journal of Personal Computer Aesthetics*, tracks the so-called digi-
continues

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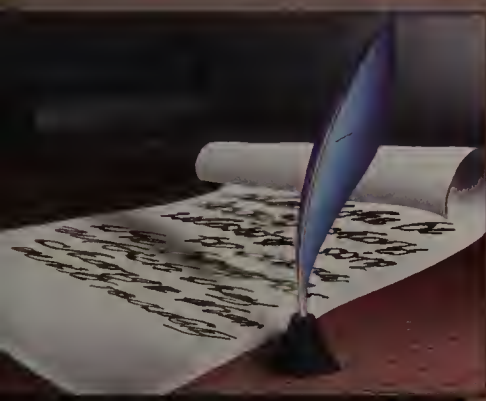
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The Evolution of CAD

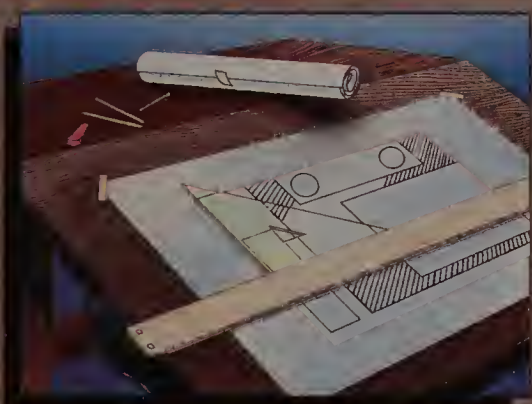
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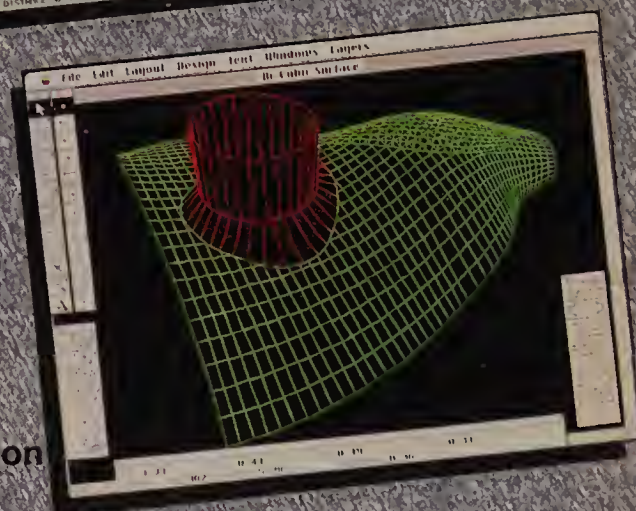
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Dealers circle 337 on reader service card

tal art life-style. A recent issue included articles on creating type effects in PhotoShop; a gallery of art; and an interview with Mac-using musician Graham Nash and his partner. The magazine is \$7 on the newsstand; call 619/233-9977 for a one-year subscription (\$24). Issue number five of *Mondo 2000* included several seriously strange fashion layouts (including vinyl, plastic, and rubber clothing from a Dutch designer); computer game reviews; and many interviews with musicians. A

five-issue subscription is \$24; call 510/845-9018 for details.

User Groups

USER GROUP NEWSLETTERS OFTEN make for good reading. BMUG's is justly famous—the spring issue weighed in at 2¼ pounds and 467 pages. Several smaller publications are also worth perusing. My favorites include *The Apple COREspondent*, from the Lansing (Michigan) Area Mac and Lisa User Group; *FatBits*, from

the Conejo-Ventura Macintosh User's Group; and *The Mac Street Journal*, from the New York Macintosh Users Group.

I read the ten-page *Apple COREspondent* largely for the opinionated writings of Andy Frederick, a sometimes caustic former user-group president. (It doesn't hurt that the group gave me a subscription until the year 3000.) LAMA-LUG can be reached at P.O. Box 27372, Lansing, MI 48909; membership is \$20.

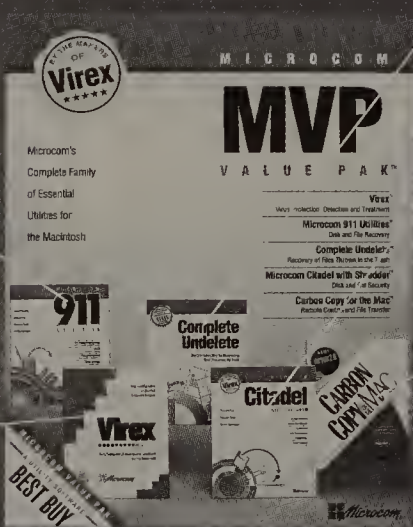
The more substantial *FatBits* (30 pages) has no table of contents but more than makes up for that lapse with "The Rumor Mill," a column by Johanna Michelle Grzywacz. One recent column covered computer chess champions, superstores, virtual reality, and the gender gap in earnings. CVMUG, the world's first

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The Mac Street Journal tracks NYMUG members' complaints or problems with specific companies

Macintosh user group, can be reached at P.O. Box 1139-CVMUG, Simi Valley, CA 93062. Membership is \$30.

The New York Macintosh Users Group is a large MUG with plenty of professional Macintosh users, so it's no surprise that *The Mac Street Journal* is so well done. Especially educational is the "Letters to the Vendor Liaison" section that follows members' complaints or problems with specific companies. NYMUG can be reached at 212/691-0496; membership costs \$45 (\$20 for students and seniors).

For additional resources, see *Conspicuous Consumer*, June 1990 and July 1991. Recent books are examined each month in the "Desktop Librarian" section of *News*. Let us know about other publications or resources that are particularly useful. **m**

Research assistance by CAROLYN BICKFORD.

Send nominees for sainthood to Service Heroes, Macworld, 501 Second St., San Francisco, CA 94107, or via AppleLink (Macworld1) or America Online (Branscum). Conversely, drop *Conspicuous Consumer* a line if a company is ignoring you.

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02424	Aldus Persuasion 2.1	324	✓
03492	Super Card 1.5	198	✓

Banner Blue Software

04806	Org Plus for Mac 1.0	125	✓
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Beagle Brothers Inc.

04327	Beagleworks	184	✓
04583	Beagleworks Competitive Upgr.	94	✓

Ceres

00588	Inspiration	159	✓
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Claris

04306	Claris Resolve	168	✓
03478	Filemaker Pro	204	✓
04651	Claris Works Tradeup Program	99	✓
04466	Claris Works	196	✓
04140	Macproject II V2.5	342	✓
04703	Macwrite II 1.1	88	✓
04302	Hypercard 2.1 Development Kit ...	134	✓
04814	Hypercard Upgrade 2.0 to 2.1	49	✓

Delta Point

04805	Deltagraph Pro	198	✓
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Digital Concepts

04560	4Th Right! Professional	449	✓
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Fisher Idea Systems, Inc.

00897	Idea Fisher 2.0	387	✓
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Fox Software

02581	Foxbase+/Mac 2.01	264	✓
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Individual Software

00432	Individual's Resume Maker	26	✓
	Training for Word or Pagemaker ...	54	✓

International Business Software

00474	Data Club Elite	1149	✓
04746	Data Club Classic 3 user	249	✓

Jian Tools

04257	Biz Plan Builder	88	✓
01045	Employee Manual Maker	98	✓

Lotus Corp

00518	Lotus 123 - Mac Competitive Upgr.	89	7	✓
00507	Lotus 123 Mac Prerelease Price ..	328	7	✓

Microlytics

00438	Random House Encyclopedia Mac	67	✓
01501	Wordfinder for Mac	33	✓
00416	Elements of Style 1.0 Mac	34	✓

Microsoft Corporation

00356	License Pak for Excel 3.0 Mac	243	✓
00227	Excel 4.0 - Mac	298	✓
04545	Excel 4.0 Live Upgrade Mac	98	✓
01220	Powerpoint 2.01	244	✓
00427	Microsoft Office V2.0	474	✓
00567	Microsoft Works 2.0C	154	✓
04161	Project for the Mac	444	✓
00596	Word 5.0 Mac Live Upgrade	124	✓
04898	Word 5.0 Mac	294	✓
00557	Microsoft File	123	✓
02054	Quick Basic 1.0	63	✓

Nolo Press

00481	Will Maker 4.0 Mac	31	✓
03781	For The Record 2.0 Mac	30	✓

NorthCon Technologies

00609	Double Helix V3.5	428	✓
02661	Double Helix 3.5 Multiuser Kit	368	✓

Now Software

00580	Now Up To Date	64	✓
00572	Now Up To Date 5 User	264	✓

Paragon Courseware

00999	Nisus Compact	92	✓
03479	Nisus 3.06	236	✓

Palo Alto

03910	Business Plan Toolkit	94	✓
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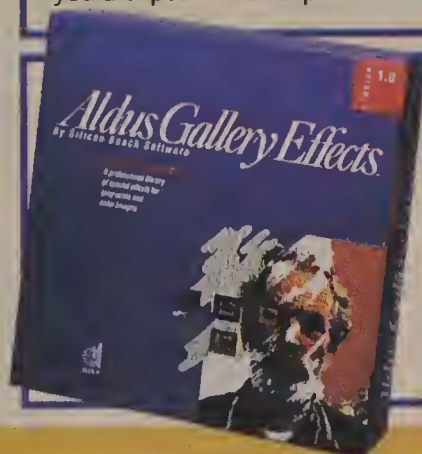
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00903 Serius Programmer 3.0	279 ✓
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00483 Sensible Grammar	54 ☐ ✓
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04095 Think C V.5.0	199 ☐ ✓
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00975 Bus.Power Bndl-Bus.Ltrs, Library of Quotes, Writing Guide	59 ☐ ✓
03813 Correct Gramar 3.0	49 ☐ ✓

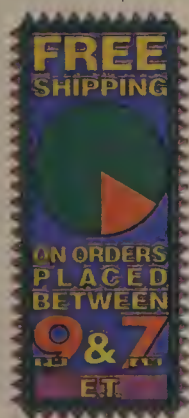
Aldus SuperPaint 3.0 \$132

Aldus SuperPaint is the complete painting, drawing and image-enhancement tool—whether you're creating fine art, business illustrations, full color or black and white. It combines three fine art applications into one unified graphics environment that works exactly the way you'd expect—no surprises. Aldus #04190 ☐ ✓



Gallery Effects \$128

Aldus Gallery Effects gives designers the power to transform color, grayscale or even bitmapped images into sophisticated art. With the library included, artists can produce vivid, dramatic art easily, reliably and with consistent results. It works as a stand-alone application or can be accessed from most leading applications supporting plug-in filters. Aldus #04121 ☐



ScanMan 32 \$\$\$ 1/2 w/ CatchWord Pro

\$378

Some of the ScanMan Model 32's many features are: 32 gray scale and advanced halftone for superior image quality; true 400dpi scanning resolution; half-page scanning width; advanced output controls; tear-off tool palette; works with all applications, including HyperCard. With CatchWord OCR software you'll capture text with high-level accuracy. Logitech #00670 ☐ ✓



ADDmOTION

PROMOTION

\$248 PROMotion w/PrimeTime

With PROMotion's 24-bit-color paint, animation and sound editor you can make QuickTime Movies, storyboards and presentations, in a fraction of the time—even if you can't draw. It's the perfect choice for business and artistic professionals. Includes extensive System 7 support and Sony Print to Video. Motion Works #01039 ☐ ✓

\$64 PrimeTime

PrimeTime CD is a collection of media & clips for use with PROMotion and ADDmotion II. The CD includes a Media Browser containing over 100 actors (in both b&w and color), background props, and over 120 sound clips covering business, education and entertainment. Motion Works #1038 ☐ ✓

ADDmotion II \$\$\$

\$94

This seamless multimedia extension for HyperCard brings 24-bit-color paint, animation and sound editing to HyperCard 2.1. ADDmotion II's ease of use and price make animation and multimedia available to Mac enthusiasts and HyperCard users. Exports QuickTime Movies. Includes HyperCard 2.1. Motion Works #00194 ☐ ✓



Cliptures Vol.4 \$67 World Flags

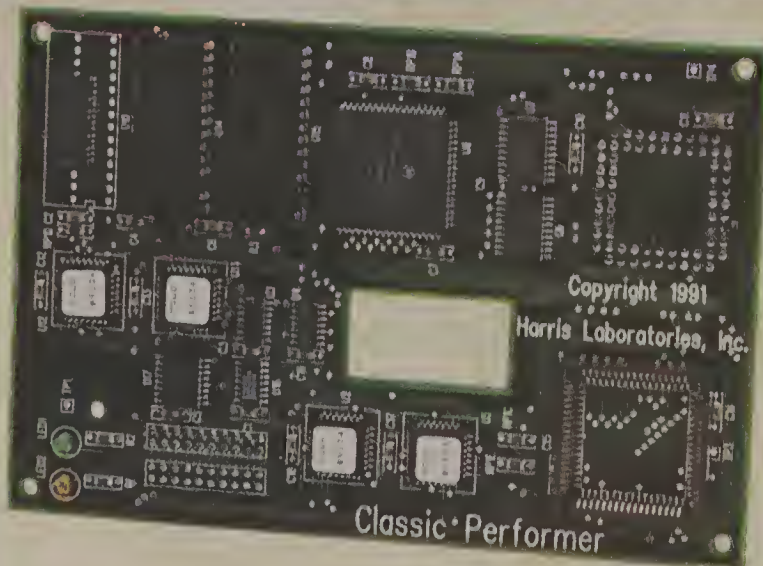
World Flags contains exquisitely detailed national and civil flag illustrations from all the independent and dependent countries of the world, plus various international, organization and code flags. Dream Maker Software #04282 ☐ ✓

Accelerate Your Mac

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Accelerate Your Classic

**NEW
PRODUCT**



As reviewed in
MacWEEK 2/17/92

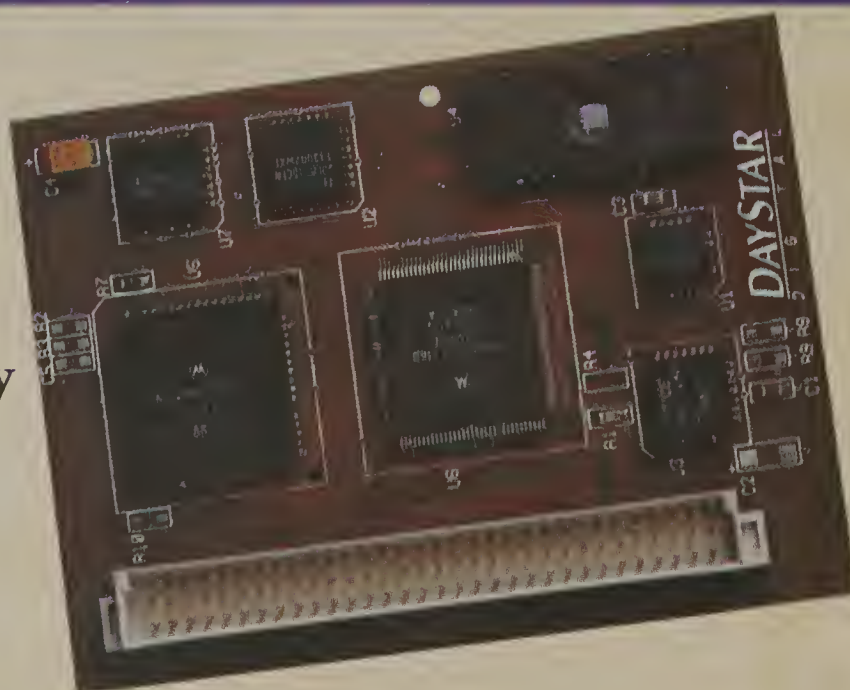
**Classic
Performer
\$248**

The Classic Performer is designed to turn your Mac Classic into a serious business tool. With its 16MHz architecture and 96K cache it doubles your processing power, accelerates program loading and increases file sorting speed. With it you can run your favorite applications such as PageMaker, MS Word, Excel and others. It installs in under 15 minutes and carries a manufacturer's lifetime warranty. Harris Laboratories #04646 7 ✓

Math Coprocessor Upgrade #04647 \$74

Get More from your Mac LC from DayStar

**Equalizer
LC Memory
Upgrade
w/FPU
\$336**



This 68030 upgrade for your Mac LC gives you the virtual memory you need...10, 20, 100 Mb or more, all for one price! This 16MHz 68030-based processor (the LC comes stock with a 68020) gives you enough power to run Apple's System 7 virtual memory. The math chip is great for recalcs and math/science programs. PowerMath software adds even more of a boost to many other math functions. Buy today, and you can upgrade the PowerCache when your needs expand. DayStar Digital #00579 7 ✓

Equalizer LC Memory Upgrade w/o Math Coprocessor #00560 \$259

DAYSTAR
D I G I T A L

PowerMath LC \$118

Run math, spreadsheet and science programs at speeds you didn't think were possible on an LC. The PowerMath LC package includes PowerMath software to provide even greater math performance. DayStar Digital #05003 7 ✓

ACCELERATORS, MEMORY AND UPGRADES

Applied Engineering

00289	Cache-In (IIci Cache Card)	194	7 ✓
00833	QuickSilver IIsi Cache Card	269	7 ✓
00873	TransWarp 040	2189	7 ✓
03673	Quadralink	208	7 ✓
04072	Cache In 50 with FPU	1899	7 ✓
04120	Fast Math LC	139	7 ✓
04154	QuickSilver IIsi w/FPU	298	7 ✓
04325	TransWarpSEAccel25MHz w/FPU	798	7 ✓
04732	TransWarp LC 33MHz w/FPU	999	7 ✓
04735	TransWarp SE 40 MHz w/FPU	1499	7 ✓
04903	TransWarp LC 33MHz	799	7 ✓
04904	Fastmath Classic II	169	7 ✓
04732	TransWarp LC 33MHz	998	7 ✓
04904	Fastmath Classic II	139	7 ✓

DayStar Digital

00560	Equalizer LC Virtual Mem Upgr	259	7 ✓
00561	Fast Cache 040 f/Quadra700/900	374	7 ✓
00562	Fast Cache PDS CI/SI Fpu+ Adpt	394	✓
00579	Equalizer LC Mem Upgr w/Fpu	336	7 ✓
02877	Fast Cache IIci 64K Ram	278	7 ✓
03729	SCSI Powercard w/o Simms	1124	7 ✓
03730	Ram Powercard w/o Simms	499	7 ✓
04181	Fast Cache IIsi	309	✓
04182	Dual Port IIsi w/FPU	169	✓
04183	Dual Port IIsi nout FPU	104	✓
04319	Universal Powercache 40MHz	868	✓
04320	Univ.Powercache 40MHz w/FPU	1078	7 ✓
04321	Universal Powercache 50 MHz	1348	7 ✓
04322	Univ.Powercache 50MHz w/FPU	1638	7 ✓
04323	Universal Powercache 33 MHz	643	7 ✓
04634	Univ.Powercache 33MHz w/FPU	863	7 ✓
04549	Cache Adapter LC	38	✓
04707	Cache Adapter IIsi	38	7 ✓
04708	Cache Adapter PDS (SE/30)	38	7 ✓
04709	Cache Adapter II	38	7 ✓
04710	Cache Adapter IIx	38	7 ✓
04711	Cache Adapter IIcx	38	7 ✓
05003	Power Math LC	118	7 ✓
05004	Combo Cache II si w/ FPU	334	7 ✓
05005	Combo Cache IIsi	258	7 ✓
05006	Fast Cache IIci (32k)	184	7 ✓

Dove Computer

00964	Macsnap 524Xs 512Ke-1Mb		
	w/SCSI	248	7 ✓
01260	SCSI Port Adapter Macsnap	99	7 ✓
03818	Macsnap 596Xs 512Ke-4Mb		
	w/SCSI	455	7 ✓

Harris Laboratories, Inc.

04646	Classic Performer	248	7 ✓
04647	68881 Math Coprocessor Upgr.	74	7 ✓



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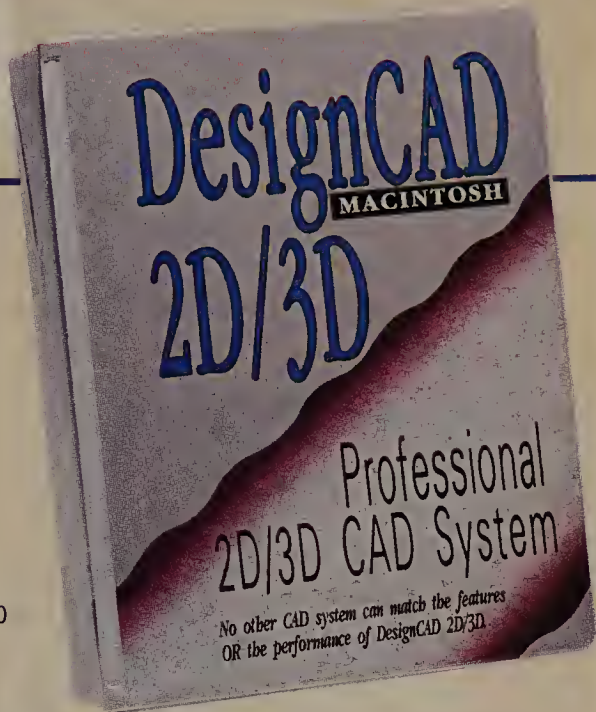
Aladdin Systems, Inc.	
3458 Stuffit Deluxe	59 ⌚ ✓
Alsoft	
2853 Diskexpress II 2.0	49 ⌚ ✓
Casa Blanca Works, Inc	
4962 Drive Share	69 ⌚ ✓
858 Drive 7 Universal Formatter 2.0	59 ⌚ ✓
Dantz	
4722 Disk Fit Pro	69 ⌚ ✓
4194 Retrospect Remote	263 ⌚ ✓
2586 Retrospect 1.3	146 ⌚ ✓
Fifth Generation	
4413 Disklock 2.1	117 ⌚ ✓
FWB, Inc.	
555 Hard Disk Toolkit	124 ⌚ ✓
Golden Triangle	
4724 Disktwin 2.0	699 ⌚ ✓
861 Twinit	169 ⌚ ✓
Handoff Corporation	
855 Trashmaster 1.0	39 ⌚ ✓
Microcom	
2077 Virex 3.1 For Mac	56 ⌚ ✓
Salient	
4955 Auto Doubler	48 ⌚ ✓
3515 Disk Doubler 3.7	46 ⌚ ✓
3516 Partner 1.01	55 ⌚ ✓

Symantec	
4890 Norton Utilities 2.0	98 ⌚ ✓
116 Sam 3.0	64 ⌚ ✓
Terranetics	
863 Autoback	94 ⌚ ✓

DesignCad 2D/3D V3.0

\$159

DesignCAD 2D/3D provides the speed and accuracy necessary to manipulate complex two- and three-dimensional designs. It's designed for engineering, animation, desktop publishing and multimedia. Provides file support for DXF, IGES, XYZ, PICT, RIB. DesignCAD, Inc. #04180 ⌚



Design Your Own Home:

Architecture #03609
Interiors #03611
Landscape #03610

\$62 each

Whether you are a professional or a do-it-yourselfer, Design Your Own Home can make your planning time more productive. Each program includes sample plans and a try-out section to get you started, plus command cards to keep by your side as you work. There are 3 programs: Architecture (floor plans to structural details), Interiors (furnishings to color schemes), and Landscapes (trees to fences). Includes several sample plans. Abracadata ⌚ ✓

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Radius Rocket 25i/24X Card Bundle

\$2498



The all new Radius Rocket 25i features Motorola's 68LC040, an '040 processor without the integrated math coprocessor and without the price tag. It's the ideal CPU upgrade for the Macintosh II user who doesn't need floating point instructions in a math coprocessor. If you use Quark XPress, Adobe Illustrator or Microsoft Word you won't miss this capability or the added expense. The new Radius PrecisionColor 24x offers 24-bit color with on-board QuickDraw acceleration, at just the fraction of the cost of the competition. You also get the added benefit of multiple resolutions with "on-the-fly" switchability. Radius #01004 ⌚ ✓



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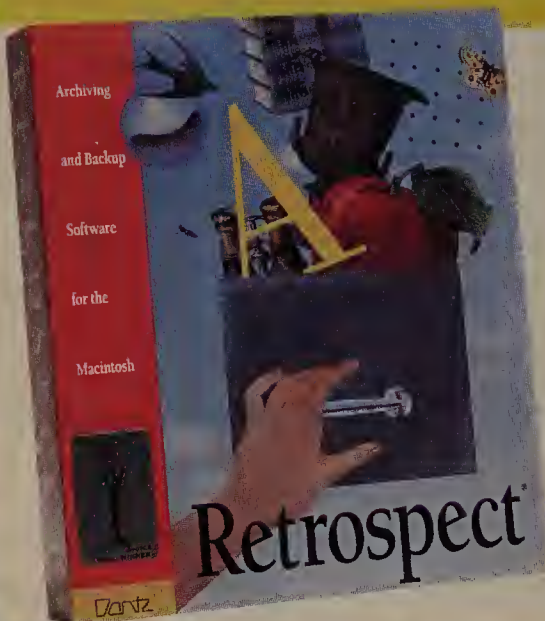
\$62

Enhance the performance of your Mac with AlSoft Power Utilities. The package includes seven helpful units: a disk space manager, a disk partitioner, a System 7 menu enhancer, a disk and directory diagnostic program, a screen saver, a disk activity indicator, a font suitcase and application manager. AlSoft, Inc. #00628 ✓



SCREEN UTILITIES

Baseline Publishing	
3762 Talking Moose	23 ✓ ✓
Berkeley Systems Design	
4046 More After Dark Bundle V.2	40 ✓ ✓
4053 More After Dark Vol. 1	23 ✓ ✓
2785 After Dark 2.0U	28 ✓ ✓
Bright Star	
At Your Service Characters	10 ✓ ✓
00415 At Your Service	30 ✓ ✓
Doclick Software	
908 Menufonts 4.0	44 ✓ ✓
3616 Clickchange 1.04	55 ✓ ✓
Fifth Generation	
04776 Suitcase II 2.0	49 ✓ ✓
2194 Pyro! 4.0 for Mac	24 ✓ ✓
Preferred Publishers	
3554 Screen Shot	30 ✓
Thought I Could	
4762 Wallpaper	37 ✓ ✓



Retrospect 1.3

\$146

Retrospect provides automatic, unattended backup for any Macintosh to tape, cartridge or optical device. Set it up once, and the built-in calendar backs you up again and again. It also saves hard disk space by archiving seldom-used files to the backup media for future retrieval. Retrospect Remote brings the power of Retrospect to an entire AppleTalk network. Dantz #02586 ✓

Retrospect Remote #04194 **\$263**

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LETS YOU FIND THE PROBLEM

\$128

Snooper #05025 ✓

Snooper w/Nubus Card #05026 ✓... **\$168**

DIAGNOSTIC SOFTWARE FOR MACINTOSH

The next time you see a 'sad Mac' on your screen or your Mac's performance isn't up to par, DIAGNOSE FROM YOUR DESK with SNOOPER, the revolutionary new standard for Mac diagnostic and testing tools. SNOOPER performs a comprehensive suite of tests, CHECKS ALL YOUR HARDWARE and identifies any problems. And the same SNOOPER software runs on all Macs.

SNOOPER is easy to use and saves time and money. If you already own Norton Utilities, complete your Mac utilities with SNOOPER hardware diagnostic.

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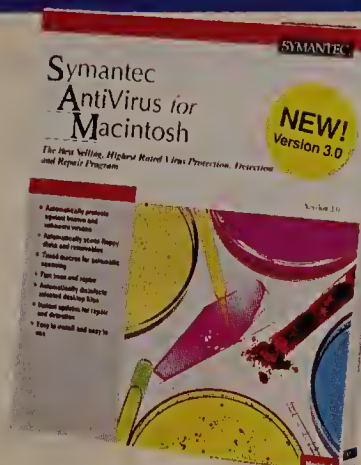
VIRUSES: DON'T WAIT...INNOCULATE!

S.A.M. 3.0

\$64



SAM is the best-selling, highest-rated virus protection, detection and repair program for the Macintosh. It intercepts viruses, scans and repairs files, combats known and unknown viruses and more. Symantec #00116 ✓✓



Virex

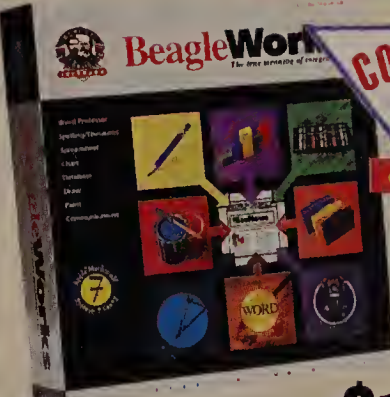
\$56



Protect your valuable data from the risk of invasion by computer viruses. The Virex 3 INIT repairs your damaged files instantly, before a virus finishes its destructive purpose. The program is user-configurable, so you can adjust it to knock out new viruses that may (will!) occur. Microcom #02077 ✓✓

Virex

With the Virex INIT



COMPETITIVE

\$94

#04555

•UPGRADE•

BeagleWorks

\$184

BeagleWorks combines a full-function word processor, spreadsheet, charting program, database, painting program, drawing program and communications module into one package. This truly integrated program lets you combine data from all other modules and make changes (edit in context), all without leaving your document! Beagle Bros. #04327 ✓✓



\$308

AE PlusDrive 1.44/800K FD

The new 1.44Mb floppy "plus drive" is one of the finest available for the Mac. It includes SuperDrive capability with the Mac Plus, SE and Mac II family; MS-DOS compatibility; two color read/write activity light; die cast Apple "platinum" case; and manufacturer's full one-year warranty. Applied Engineering #04956 ✓✓

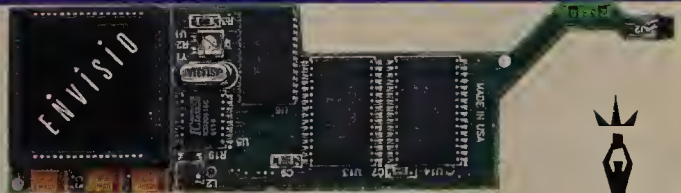


\$548

Envisio

The Eddy Award-winning Envisio Display Adaptor allows you to hook up your PowerBook to an external monitor. It supports all Apple and many VGA displays via a lightweight, internally mounted video interface. Envisio, Inc. #05165 ✓✓

NoteBook Display Adapter 030 1.0, 2Mb #05167 ✓✓..... \$638



NEW FOR YOUR POWERBOOK

Universal NoteBook Case

\$74

The Universal NoteBook Case is made of a new material that is both stylish and durable. The computer compartment has an extra layer of foam padding and Velcro straps to secure the computer. The other has Velcro-adjustable dividers for supplies. Targus #07454 ✓✓

MODEMS AND FAXES

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Abaton Technology Corp

02154 Interfax 12/48 Faxmodem 264 ✓
02987 24/96 Faxmodem 110V 338 ✓
03186 24/96 Faxmodem 220V 338 ✓

Applied Engineering

03666 Modem 2400 MNP 5 External 195 ✓
03667 Modem 2400 MNP 5 SendFax Ext 235 ✓
03668 Modem 2400 MNP 5 Internal 195 ✓
03669 Modem 2400 MNP 5 SendFax Int 269 ✓
03980 Mac LC 24/96 Sendfax Modem 245 ✓
04579 Datalink LC V.42 Fax/Modem 259 ✓

Best Data

00698 Smart One 2400 Mac Modem 110

Cypress Research

04585 FaxPro with FaxPro Share V1.0 ... 999 ✓✓

Dove Computer Corp

03318 Dove Fax 24/96 268 ✓
03514 Dove Fax Plus 370 ✓
04756 Dove Fax Lan External 498
04757 Dove Fax Lan Internal 529

Global Village Communications

00395 Teleport Fax 24/96 184 ✓✓
00949 Teleport FullFax 218 ✓✓
03883 Teleport Adb 2400 MNP 5 Modem 128 ✓✓

Hayes

00451 Personal Modem 2400+ 148 ✓✓
04796 Ultra9600 w/Smartcom II mac 698 ✓✓
07829 Optima 24/SC EZ 158

Logicode Technology

00852 Xeba 2400 Ext 99
04644 Xeba 9600S/R Fax/V.42Bis Black 199 ✓
04674 Xeba 9600S/R V42BisFaxPlatinum199

Mass Microsystems

00701 24/96 Fax Modem 179

MacTurbo

00408 MacTurbo Plus Modem 89 ✓
00977 MacTurbo 24/96 Fax Modem 149

Prometheus

00062 Promodem Ultima 498 ✓
00331 PowerBook Home Off.Int 24/96 ... 269 ✓
00877 Home Office Ultima Ext 498
00907 Home Office 24/96 w/Voice 269
03312 Promodem 2400 Mini-M 118 ✓
03313 Promodem Travel Modem 122 ✓
03608 Promodem 9600M Plus 599 ✓
04416 Prometheus 2400 Mini Plus 123 ✓✓
04596 Promodem 24/96 S/R Mini Fax+ .. 268 ✓✓

PSI Integration, Inc.

04948 PowerModem 24/96SR Internal .. 215 ✓✓

Relisys

00256 Relisys Tefax with Autofax 869 ✓✓

Shiva

01615 Shiva Netmodem V2400 338 ✓
03251 Shiva Netmodem V.32 9600 1149 ✓✓
04129 Shiva Netmodem/E 10 BaSE T ... 1749 ✓✓
04491 Shiva Netmodem E Thin/Bnc 1749 ✓
04758 Shiva Netmodem/E Thick 1749 ✓
04759 Shiva Netmodem/E AUI 1749 ✓✓

Solectek

04753 Solectek Pocket Fax Modem 219 ✓

Supra Corporation

00065 Modem 2400 Plus 148
00413 Fax Modem V.32BIS wsf/cbl 379
00414 Fax Modem V.32BIS w/o sft/cbl ... 319
00424 Fax Modem V.32 w/o sft/cbl 259
00426 Fax Modem V.32 wsf/cbl 329
02003 Modem 2400 Baud 89 ✓
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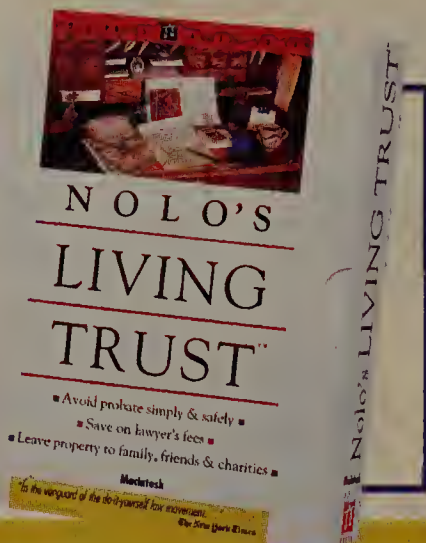
Accountant, Inc. 3.0 **\$329**

Accountant, Inc. is the Eddy-award-winning fully-integrated accounting system that's perfect for any type of business—retail, manufacturing, service or professional. It provides reports and performs analysis like no other software, so you can do what you do best and stop worrying about the accounting chores. Softsync, Inc. #00344 ✓

NOLO's Living Trust

\$43

Make sure that your wishes are followed. Write your own living trust! Easy-to-use question and answer format walks you through the process step by step. Use it for individually or jointly-owned property. Can be rewritten or modified any time you wish. NOLO Press #04720 ✓



Ark Workspace

\$78

Concentrate on your work, not on your computer. Workspace is a visual project organizer which keeps documents and applications for specific projects together in one place, where you can find them. Workspace also tracks time spent on projects—giving a daily, weekly or monthly accounting. Requires System 6.05 or later with MultiFinder. Ark Interface #05024 ✓



Minotaur Labyrinths of Crete

\$39

In Minotaur, two players compete against on another from their own computers via modem or serial cable. You and your opponents (up to 8 can play) are thrown into a huge randomly-generated labyrinth where you'll battle to the death with a number of magical and enchanted items. Bungie Software #00639 ✓



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1871	Payroll 4.0	108 ⑦ ✓
Checkmark Software		
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2411	Payroll 4.5	171 ⑦ ✓
Computer Associates		
4533	Simply Accounting for the Mac	134 ⑦ ✓

Dac Software		
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Intuit		
4230	Quicken 3.0 Mac	42 ⑦ ✓
Peachtree Software		
2598	Insight Expert Series	295 ⑦ ✓
2594	At Once!	189 ⑦ ✓
Shopkeeper Publishing		
0439	ShopKeeper Plus	309 ⑦ ✓
0428	Bill-It 4	114 ⑦ ✓
Softsync, Inc.		
4778	Accountant Inc. Multi User Pak ...	560 ⑦ ✓
0344	Accountant Inc. 3.0	329 ⑦ ✓
Survivor Software		
1582	MacMoney 3.5	58 ⑦ ✓
Teleware Incorporated		
4712	M.Y.O.B. 2.1	138 ⑦ ✓
Timeslips		
1044	Timeslips III v2.1	194 ⑦ ✓
0403	Timeslips III Network 5 User	529 ⑦ ✓

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Disctech Corporation		
4550	Facilitator	219 ⑦ ✓
NOLO Press		
481	Will Maker 4.0 Mac	31 ⑦ ✓
3781	For The Record 2.0 Mac	30 ⑦ ✓
4720	Living Trust	43 ⑦ ✓
Now Software		
580	Now Up To Date	66 ⑦ ✓
Pastel Development		
4752	Daymaker	64 ✓
Psybron		
200	Contact 1.0	59 ✓
288	CalenDAr (DA) 1.1.3	39 ✓
Superoffice Corp		
4966	Super Office Single User	248 ✓
1001	Super Office Competitive Upgrade .	69 ✓
The Open University		
4671	The Desktop Lawyer Mac	69 ⑦

Operation Desert Storm V1.5

\$27

Join the forces in the gulf in this realistic full-color battle simulation! Experience full screen action on any monitor as you command your M1A1 Abrams tank on a series of missions against a hostile, well-equipped enemy. Bungie Software #04106 ✓



TransWarp Accelerators

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High-Performance TransWarp Accelerators

TransWarp LC

33 Mhz w/ FPU

\$988

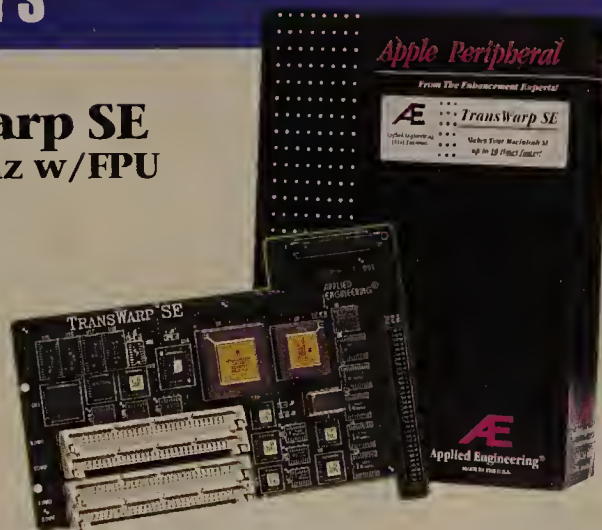


Tired of waiting for your LC to catch up? TransWarp LC provides high speed performance for the Macintosh LC. This 68030 CPU/68882 FPU upgrade for the Mac LC helps eliminate the time you spend waiting on your computer. Desktop publishing, graphic design and CAD packages become fun again. Applied Engineering #047327 ✓

TransWarp SE

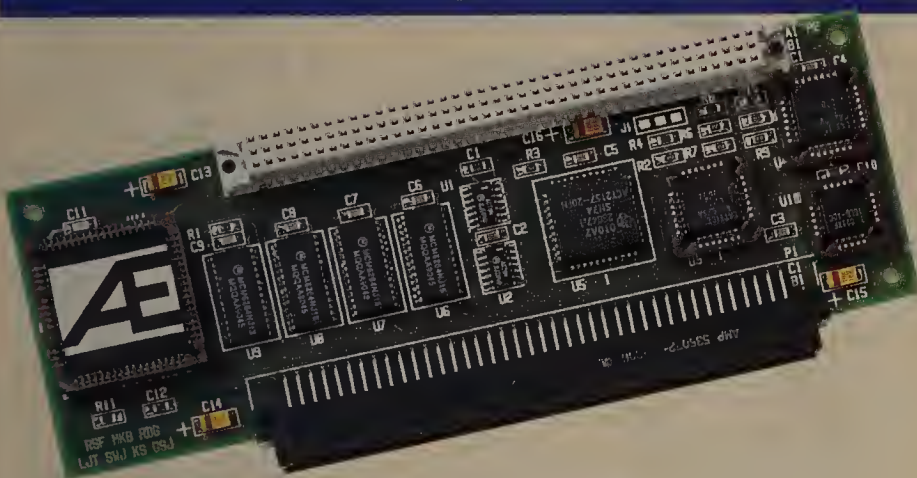
Accel 25Mhz w/FPU

\$798



The TransWarp SE 030 gives you up to 10 times the speed of the standard SE. The board comes standard with a 68882 Floating Point Unit (FPU) math chip which greatly enhances the speed of any math functions, so your spreadsheets and CAD programs run faster than ever before. Applied Engineering #043257 ✓

Boost your Mac to Lightning Speeds with AE Cards



QuickSilver IIsi

CacheCard

\$269

The QuickSilver IIsi CacheCard is a 32K static RAM cache board for the Macintosh IIsi. QuickSilver provides a 40% performance increase over the standard IIsi. QuickSilver comes standard with an SE/30 slot extender, which allows SE/30 cards to be used in the IIsi, and an optional 68882-20MHz FPU for increased floating point equation performance. Applied Engineering #008337 ✓



Quadralink

w/ Shadow

\$208

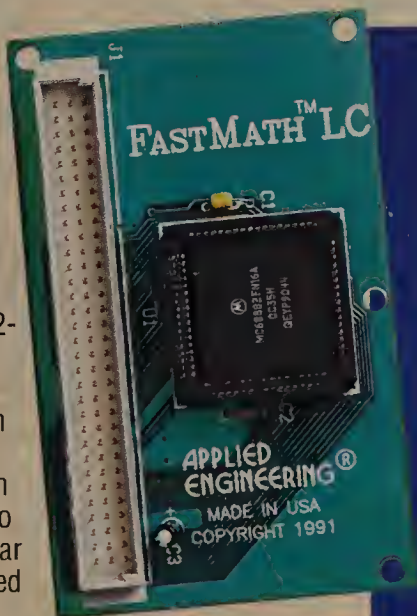


QuadraLink gives your Mac II four additional serial ports. No more reaching behind your computer to unplug one printer and plug in another. No more shorting-out serial devices by connecting them while your computer is on. QuadraLink works as an electronic switch box, allowing you to easily switch between any devices connected to one of its ports or your computer's printer and modem ports. Applied Engineering #036737 ✓

Fast Math LC

\$139

Make your LC a math whiz with the FastMath LC card. Its 68882-16MHz FPU dramatically increases the speed of math intensive applications. FastMath LC plugs easily into the LC's processor direct slot (PDS) with no switches to flip or jumpers to move. Comes with a full five-year manufacturer's warranty. Applied Engineering #041207 ✓



Applied Engineering has a card to fit most Macintosh computers. Applied Engineering accelerators boost the Macintosh SE, Classic, LC, II, IIfx, IIx, IIci and IIfx to lightning speeds. All Applied Engineering cards are backed with a manufacturer's 30-day money back guarantee, and a full one-year warranty.

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THE OUTBOUND



The perfect portable is the one you design yourself.

Meet the new Outbound™ Notebook Systems. Smaller, lighter and faster than their Apple® counterparts, the Outbound Notebook Systems sport an ingenious modular design that lets you "mix and match" the CPU, hard drive, and memory you want, *before and after you buy*. You get the performance you need right from the start. Then, as your hunger for power grows, you can upgrade your Notebook simply and easily with standard low-cost modules.

Don't give up anything

Outbound's "mix and match" system lets you choose from two to 14 MB of RAM, a hard disk from 20 to 120 MB, and lightning speeds of 20 to 33 MHz. With any combination, you'll have all the power and memory you need for your demanding applications. Naturally, the Outbounds are equipped with all of the ports you'd expect in a Mac® a standard SCSI, communications, sound, ADB and printer. There is even a built-in microphone and speaker.

Enjoy Mac compatibility

Your Outbound Notebook is ready for action the minute you unpack the box, because the Macintosh ROM is already installed for compatibility with the thousands of Macintosh applications. Systems come with the memory conscious System 6.0.7 installed, and are completely compatible with System 7. And of course, all models include an internal SuperDrive™-equivalent 3½" floppy disk drive for working with high and low density Mac and MS-DOS diskettes.

Perform big business in small places

Small enough to fit in most briefcases, all models measure 8.5 x 11 x 2.1 inches, weigh only 6.25 pounds, and boast a full-size, silent keyboard. In tight quarters, use the keyboard mounted TrackBar™ to point and click. Or, add a mouse or other ADB pointing device. The backlit LCD screen is large and easy to read, and provides 17% more displayable area than the Apple PowerBook™ screens.

Notebook prices based on direct sales. PowerBook prices reflect published Apple retail pricing. Technical specifications and prices subject to change without notice. The Outbound name, logo and TrackBar are trademarks of Outbound Systems, Inc. Apple, Macintosh and Mac are registered trademarks of Apple Computer Inc. PowerBook and Apple SuperDrive are trademarks of Apple Computer Inc. All other brand and product names mentioned herein are trademarks or registered trademarks of their respective holders.

What the experts say:

"Outbound offers top-notch portable Mac."
MacWEEK Magazine

"Outbound's notebooks are solid machines and deserve serious consideration by anyone contemplating buying a Mac notebook."
Macworld Magazine

"Outbound's new Notebook System has the unique ability to grow along with your requirements - and your budget."
MacUser Magazine

"Innovative touches, a high degree of compatibility, and moderate pricing make the Outbound Notebooks strong competitors with Apple's portable Macs."
Portable Office Magazine

"For me, the Outbound Notebook is the better choice."
BYTE Magazine

MODEL	THE OUTBOUND NOTEBOOK			MACINTOSH POWERBOOK		
	2000	2030E	2030S	100	140	170
Upgradeable CPU and Hard Disk	YES	YES	YES	No	No	No
Internal Floppy Standard	YES	YES	YES	No	Yes	Yes
Processor Speed	20MHz	25MHz	33MHz	16MHz	16MHz	25MHz
Maximum Hard Drive Available	120MB	120MB	120MB	20MB	40MB	40MB
Full Size Silent Keyboard and True Notebook Size	YES	YES	YES	No	No	No
Maximum RAM Available	4MB	14MB	14MB	8MB	8MB	8MB
Math Coprocessor	No	Optional	Optional	No	No	Yes
Maximum Silicon Disk Memory (RAM) Available	12MB	50MB	50MB	6MB	6MB	6MB
Price	2000/220 \$1999	2030E/220 \$2499	2030S/440 \$3899	100/220 Ext. Floppy \$2199	140/220 \$2899	170/440 \$4599

ORDER DIRECT AND SAVE - PRICES START AS LOW AS \$1999

You can order your Outbound Notebook System right from the folks who make it. Just call toll-free and use your credit card. And, when you call, be sure to ask about our low-cost financing.

Smaller, lighter, faster and available now!

There's no reason to wait. Start enjoying the Macintosh environment you know and love on the road now. Let us customize an Outbound Notebook for you today. There's no risk when you buy, because every Outbound Notebook System purchased direct comes with a FULL 10 DAY MONEY BACK GUARANTEE OF SATISFACTION, one year warranty, and toll-free customer support.

ORDER DIRECT TODAY AT:

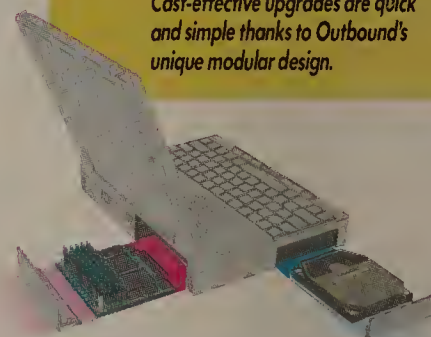
1-800-444-4607

IN CANADA CALL 1-800-463-3257

or call Outbound for the dealer nearest you.
7 a.m. to 6 p.m. Mon-Fri. and 8 a.m. to 4 p.m.
Saturdays MST. Visa, MasterCard and
American Express accepted. Overnight
shipping available.



Cost-effective upgrades are quick and simple thanks to Outbound's unique modular design.



Outbound Systems, Inc. 4840 Pearl East Cir.
Boulder, Colorado 80301
Phone: 303.786.9200 Fax 303.786.8611

Updates

JUNE 1992

THIS SECTION LISTS
THE LATEST VERSIONS OF SELECTED
MAC APPLICATIONS
THAT WERE SHIPPING BY THE TIME
WE WENT TO PRESS.

PRODUCT	V.	REQ.	★	\$
4TH DIMENSION	2.2	1MB/6.0		\$99
A4	3.0	2MB/6.0.5		\$395
AATRIX CHECKWRITER II	3.02	512K/4.1	*	
ACCOUNTANT, INC. PROFESSIONAL	3.0	1MB/6.0.3	*	
ACCUTEXT	3.0	4MB/6.0		\$150
ACTA 7	7.0	512KE/6.0.5	2/92	\$33.50
ADD MOTION	2.0	2MB/6.0.5	*	
ADDRESS BOOK PLUS	2.0	1MB/6.0.2	2/92	\$25
ADOBE ILLUSTRATOR	3.2	2MB/6.0.3	*	
ADOBE PHOTOSHOP	2.0.1	2MB/6.0.2	9/91	\$199
ADOBE TYPE MANAGER	2.0	1MB/6.0.2		FREE
AFTER DARK	2.0	512KE/4.1	*	
AGENT DA	2.0	1MB/6.0.5		\$30
AGFATYPE	3.0	2MB/6.0.2		FREE
AGFA TYPECHART	1.5	1MB/6.0.4	7/91	FREE
ALARMING EVENTS	1.0.3	1MB/6.0.2		\$15
ALDUS DIGITAL DARKROOM	2.0	1MB/6.0	9/91	*
ALDUS FREEHAND	3.1	1MB/6.0.5	3/92	*
ALDUS PAGEMAKER	4.2	4MB/6.0.5	5/92	*
ALDUS PERSUASION	2.1	4MB/6.0.5	*	
ALDUS SUPER 3D	2.5	2MB/6.0.5	*	
ALDUS SUPERCARD	1.6	2MB/6.0.4		\$50
ALDUS SUPERPAINT	3.0	1MB/6.0.5	3/92	\$65
ALLIANCE POWER TOOLS	2	1MB/6.0.4	*	
AMAZING PAINT	1.0.1	512KE/6.0.4		\$15
AME	2.0	1MB/6.0.2		\$49.95
ANTITOXIN	1.4	512K/3.2		\$15
APPLESHARE FILE SERVER	2.0	512K/3.2	*	
ARCHICAD	4.03	5MB/6.0	3/92	10% OF LIST
ASHLAR VELLUM	2.10	4MB/6.0.2	*	
ASHLAR VELLUM 3D	2.10	4MB/6.0.2	*	
ATONCE	1.2	1MB/6.0.5	*	
AUDIOMEDIA	2.02	2MB/6.0.7		\$29
AURACAD	3.01	1MB/4.0		\$90
AUTHORWARE PRO	1.7	2MB/6.0.5	*	
AUTOSAVE II	2.0	512KE/4.2	*	
A/UX	2.0	4MB/6.0.5	*	
AZIMUTH	2.1	1MB/6.0.2		\$45

PRODUCT	V.	REQ.	★	\$
BACKFAX	2.0	1MB/6.0.3		\$75
BACKMATIC	2.0	1MB/4.2	2/92	*
BILL-IT	2.6	1MB/6.0.3		*
BITSTREAM TYPEFACE LIBRARY	1.5	1MB/6.0		*
BUSINESS SENSE	1.5	1MB/6.0.7		\$69
CA-CRICKET PRESENTS	2.0.1	1MB/6.0		*
CALENDAR	1.1.2	512KE/6.0		FREE
CANOPENER	2.0	512K/3.0		\$29
CANVAS	3.0	1MB/6.0.2	1/92	*
CARBON COPY MAC	2.0	1MB/6.0.5	4/92	*
CAT III	1.1	1MB/6.0		*
CHECKLIST	2.0	1MB/6.0	2/92	*
CINEMATION	1.0	4MB/6.07		NA
CLARIS CAD	2.0.2	2MB/6.0		\$79
CLARIS RESOLVE	1.0.1	1MB/6.0.5	1/92	NA
CLARISWORKS	1.0	1MB/6.0.5	3/92	NA
CLICKCHANGE	1.05.2	1MB/6.0.4		\$5
CLICKPASTE	2.1	1MB/6.0		*
CMS UTILITIES	7.0	2MB/7.0		\$25
COLOR MACCHEESE	2.07	1MB/6.0.5		\$15
COLORSTUDIO	1.5	4MB/6.0.5	3/92	*
COMPUSERVE INFORMATION MANAGER	1.5	1MB/4.1		*
COMPUSERVE NAVIGATOR	3.1	512K/4.1		*
CONCERTWARE+	4.0	512KE/4.2		\$15
CONNECTIONS	2.0	2MB/6.0.5	4/92	NA
CORRECT GRAMMAR	2.0	1MB/4.2		*
DATA CLUB CLASSIC	2.0	2MB/6.0		*
DATA SHAPER	1.2	1MB/6.0		\$40
DECK	1.03	2MB/6.0.7		FREE
DELTA GRAPH PRO	1.0	2MB/6.0.5	5/92	\$75
DELUXEMUSIC CONSTRUCTION SET	2.5	512K/6.0.2		*
DESCARTES	1.04	2MB/6.0.3		FREE
D.E.S. DOCUMENT EXCHANGE SYSTEM	4.1	1MB/6.0		*
DESIGNCAD	3.0	2MB/6.0.5		*
DESIGNCAD 2D/3D	3.0	2MB/6.0.5		\$50
DESIGNSTUDIO	2.0	1MB/6.0	11/91	*
DESKPAINT	3.07	1MB/6.0.5		\$19.95
DIGITAL DARKROOM	2.0	1MB/6.0.4	9/91	\$80
DISKDOUBLER	3.7	1MB/6.0.2		\$15
DISKEXPRESS II	2.10	1MB/6.0		FREE
DISKFIT PRO	1.0	1MB/6.0	4/92	\$32.50
DISKTOP	4.01	1MB/6.0		*
DISPLAY ADBUILDER	1.1	1MB/6.0.3		*

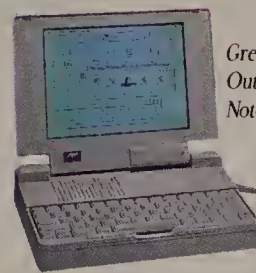
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V. = version #. Req. = min. RAM and system software required. ★ = last time (in the past year) this or an earlier version was reviewed. \$ = cost of update to registered owners. NA = first version, not applicable. * = contact your dealer for update policy. Blue = new version. Yellow = reviewed product.

OUTRIGGER MONITOR

THE OUTBOUND

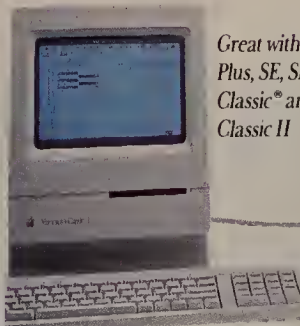
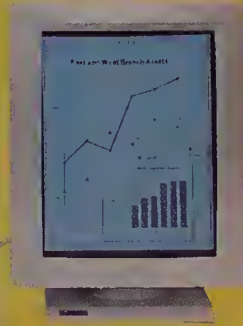
Make your
portable
more
productive.



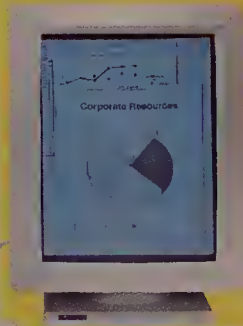
Great with the
Outbound™
Notebooks



Great with the
Macintosh®
PowerBooks™



Great with the
Plus, SE, SE/30,
Classic® and
Classic II



Take your notebook on the road, then quickly turn it into a full-sized office system by adding the Outbound Outrigger™ Intelligent Monitor. Its razor-sharp, full-page portrait display is 200% larger than a Mac Classic and 100% compatible with an Outbound Notebook, Apple® PowerBook or any Macintosh computer. The Outrigger connects directly to your computer with just a SCSI cable—no expensive SCSI interface card required. The built-in 20MHz 68000 processor means fast redraw and an extra SCSI port gives you added versatility. Get more productivity with your notebook, add the Outrigger today.

Suggested Retail Price \$949.

To order direct or for the
dealer nearest you call:

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Outbound Systems, Inc.
4840 Pearl East Cir.
Boulder, CO 80301
303.786.9200

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Circle 219 on reader service card

PRODUCT	V.	REQ.	★	\$
DOLLARS & SENSE	5.0	512KE/3.2	*	
DOUBLE HELIX	3.5	1MB/6.0		\$99
DREAMS	1.1	1MB/6.0.2	*	
DYNAPERSPECTIVE	2.3	2MB/6.0.5		\$149
DYNODEX	2.0	1MB/6.0	2/92	\$25
EASY COLOR PAINT	2.02	1MB/6.0.2	*	
EHELP	2.0	1MB/4.1		\$445
EMPOWER II	4.0.7	2MB/4.2	*	
ENCORE	2.5	2MB/6.0.2	*	
ENHANCE	2.0	2MB/6.0.3	11/91	\$100
EVOLVE	1.1	2MB/5.3		\$25
EZ VISION	1.0	1MB/6.0.3	NA	
FASTBACK PLUS	2.6	1MB/6.0	4/92	*
FAST FORMS	2.0	1MB/6.0		\$25
FASTLABEL	3.1	1MB/6.0		\$10
FASTTRACK	1.5	512KE/5.5		\$20
FAXGATE (MICROSOFT MAIL)	3.0	1MB/6.0.3		\$9/WORKSTATION
FAXGATE (QUICKMAIL)	1.5	1MB/6.0.5		\$9/WORKSTATION
FILEGUARD	2.7	1MB/4.2		\$1B
FILEMAKER PRO	1.02	1MB/4.2		FREE
FILEVISION V	1.1	1MB/6.0.2	*	
FILMMAKER	2.5	5MB/6.0.3	*	
FINALE	2.6	1MB/6.0.2		FREE
FLEXICAD	2.20	5MB/6.0.4	*	
FONTMONGER	1.0.5	2MB/6.0.2	10/91	FREE
FONTGRAPHER	3.5	1MB/4.2	*	
FONTSHARE	2.2	1MB/6.0		FREE
FONTSTUDIO	2.0	1MB/6.0.5	*	
FORM Z	2.0	2MB/6.0	*	
FOXBASE+/MAC	2.01	1MB/6.0		FREE
FRAMEMAKER	3.0	1MB/6.0	3/92	*

PRODUCT	V.	REQ.	★	\$
FREEDOM OF PRESS LIGHT	3.0.1	2MB/6.0.3		FREE
FREEDOM OF PRESS PROFESSIONAL	3.0.2A	4MB/6.0.3		\$250
FULL IMPACT	2.0	1MB/6.0		\$50
FULLWRITE PROFESSIONAL	1.5	2MB/6.0.2	*	
GENERIC CADD	1.1	1MB/6.0.5	*	
GEOQUERY	3.0	1MB/6.0	*	
GOFER	2.0	1MB/4.1	3/92	\$25
GRACELAN	2.0	1MB/6.0.5	*	
GRACELAN UPDATE MANAGER	1.0	2MB/6.0.5		NA
GRAMMATIK MAC	2.05	1MB/6.0		\$15
GREAT GANTT	1.4	1MB/6.0	*	
GREAT PLAINS ACCOUNTING SERIES	6.0	1MB/4.2	*	
GREATWORKS	1.0	1MB/6.0.2	1/92	NA
GUIDE	2.0	512K/4.1		\$50
HAND-OFF II	2.2.1	1MB/6.0		FREE
HELP	1.0.1	1MB/6.0	2/92	FREE
HYPERCARD	2.1	1MB/6.0.3		\$49
HYPERDA	2.0	512K/3.2	*	
ICON-IT	2.1	1MB/6.0.2	*	
IF:X FORMS DESIGNER	1.1	1MB/6.0		FREE
IGOR	1.2	2MB/4.1		\$35
IMAGESTUDIO	1.7	1MB/6.0		\$99
IMAGE GRABBER	3.0	1MB/6.0	2/92	\$1B
INFINI-D	1.1	4MB/6.0.4	9/91	FREE
INFOLOGIC ENVELOPE	1.1C	512KE/4.0		\$5
INITPICKER	2.02	1MB/6.0		\$10
INSIDE OUT	II	1MB/6.0.2	*	
INSIGHT EXPERT ACCOUNTS PAYABLE	2.1.1	1MB/6.0	*	

PRODUCT	V.	REQ.	★	\$
INSIGHT EXPERT ACCOUNTS RECEIVABLE	2.2	1MB/6.0.2	*	
INSIGHT EXPERT GENERAL LEDGER	2.2	1MB/4.2		\$99
INSPIRATION	3.0	1MB/4.2	12/91	*
INSTANT-EXPERT PLUS	2.0	1MB/5.0		FREE
INTERFACE RAVE	2.0.5	2MB/6.0.4		FREE
INTOUCH	1.1.7	512KE/4.2	3/92	FREE
ITHINK	2.0	2MB/6.0.2		\$149
KALEIDAGRAPH	2.1	2MB/6.0.5	9/91	\$20
KIWIENVELOPES	3.1	512KE/4.1	*	
LABVIEW	2.2	4MB/6.0.5	10/91	*
LANGUAGE SYSTEMS FORTRAN	3.0	2MB/6.0.4		\$100
LAPLINK MAC III	3.2	512K/2.0		FREE
LAPLINK MAC PLUS III	3.0	512K/2.0	*	
LASERPAINT COLOR II	1.02	1MB/6.0.3		FREE
LETRASTUDIO	2.0	2MB/6.0	*	
LIGHTSPEED COLOR LAYOUT SYSTEM	2.5	1MB/6.0.5	*	
MACANALYST	3.1	2MB/6.0	*	
MACARCHITRION	5.5	2MB/6.0.3	*	
MACBRAIN	3.0	1MB/6.0.5		\$295
MACDRAFT	2.1	1MB/6.0.2	*	
MACDRAW II	1.1	1MB/6.0	*	
MACDRAW PRO	1.0.1	1MB/6.0.5	11/91	\$99
MACENVELOPE	5.1	1MB/4.2		\$29.95
MACENVELOPE PLUS	2.0	512KE/3.2		\$50
MACFLOW	3.5.4	1MB/6.0		\$30
MACFORTRAN II	3.1	4MB/6.0.3		\$99
MACGLOBE	1.0	1MB/6.0.4	4/92	*
MACLABELPRO	1.5	1MB/6.0.3		\$19.95

Salient

Double the space on any Mac disk — by shrinking any Mac file or folder an average of 50%.

MacUser
"DiskDoublers rates as the best of its kind"
—Steve Bohrer, Contributing Editor, MacUser
★★★★★

Disk Doublers

Visibly Superior.



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PRODUCT	V.	REQ.	★	\$
MACLINKPLUS/PC	6.0	1MB/6.0.3	3/92	*
MACMONEY	3.5	512KE/4.0		\$12
MACPAINT	2.0	512KE/3.2		\$25
MACPALETTE II	2.2	1MB/6.0.5		*
MACPHONEBOOK	3.0	1MB/6.0	9/91	*
MACPLOT PROFESSIONAL	3.7.4	1MB/6.0.5		*
MACPLOT STANDARD	3.7.4	1MB/6.0.5		*
MACPROJECT II	2.5	1MB/6.0		\$99
MACRECORDER	2.03	512K/3.2		*
MACRENDERMAN	1.1	5MB/6.0.5		\$75
MACROMIND DIRECTOR	3.0	2MB/6.0.5		\$195
MACSCHEDULE	2.5	1MB/6.0		\$30
MACSCHEDULE PLUS	1.0.5	1MB/6.0		FREE
MACSPIN	3.01	512K/4.3	3/92	*
MACTERMINAL	3.0	512K/3.2		\$65
MACTOOLS DELUXE	1.2	1MB/6.0		*
MACTOPS	3.1	1MB/6.0.5		*
MACWRITE II	1.1	1MB/6.0		FREE
MANAGING YOUR MONEY	4.0	1MB/6.0.3		*
MANAPRO GENERAL LEDGER	3.1	1MB/6.0		NA
MAPGRAFIX	2.1.1	4MB/6.0.3		*
MAPLE V		2MB/6.0.7	5/92	*
MARCOPOLO	1.1	1MB/6.0		FREE
MARKET ANALYZER PLUS	2.0	2MB/6.0.2		\$99
MARKETMASTER	3.5	1MB/6.0.3		*
MARKUP	1.03	1MB/6.0		FREE
MASTERFINDER	1.1	1MB/6.0.5		*
MASTERJUGGLER	1.57	512K/6.0		\$15
MASTERPLAN	1.03	512K/6.0.5		FREE
MASTER TRACKS PRO	5.0	1MB/4.1		\$45
MATHCAD	2.06	1MB/6.0.2		FREE

PRODUCT	V.	REQ.	★	\$
MATHEMATICA	2.0	1MB/6.0		*
MATHTYPE	2.1.1	512K/6.0.2		*
MATHWRITER	2.0	2MB/6.0.5		*
MEDIATRACKS	1.01	1MB/6.0.2		FREE
MENUFONTS	4.01	1MB/6.0.5	5/92	\$20
METAPICT	2.0	512KE/4.5		\$69
META PRO	2.03	1MB/6.0		*
MICHAEL'S DRAW	1.0	1MB/6.0.5	12/91	NA
MICROPHONE II	3.0	512K/4.2		*
MICRO PLANNER MANAGER	1.0	2MB/6.0		*
MICROSOFT EXCEL	3.A	1MB/6.0.2	9/91	*
MICROSOFT FILE	2.0	512K/3.2		*
MICROSOFT MAIL	3.0	1MB/6.0.2	8/91	*
THE MICROSOFT OFFICE	1.5	1MB/6.0.2		\$129
MICROSOFT POWERPOINT	2.01	1MB/6.0		FREE
MICROSOFT PROJECT	1.1	1MB/6.0.4	11/91	NA
MICROSOFT WORD	5.0	512KE/3.2	4/92	\$129
MICROSOFT WORKS	2.0e	512K/6.0		*
MINDLINK	2.0	1MB/6.0		*
MINDWRITE	2.1	512KE/4.2		*
MINICAD+	3.1	1MB/6.0	7/91	*
MOCKPACKAGE PLUS UTILITIES	4.4	512KE/3.2		\$15
MODELSHOP II	1.1	1MB/6.0.2	3/92	FREE
MORE	3.1	1MB/4.1		*
MR. FILE	1.1.1	1MB/4.2		FREE
MULTI-AD CREATOR	3.0	2MB/6.0.3		*
MULTILEDGER	1.1	512K/3.2		\$75
MUSICPROSE	2.1	1MB/6.0		FREE
MUSIC PUBLISHER	2.5.2	1MB/6.0	12/91	\$15
MYADVANCEDMAILLIST	3.0	512K/4.1		*
MYDISKLABELER III	3.0.4	1MB/6.0		*

PRODUCT	V.	REQ.	★	\$
M.Y.O.B.	2.0	1MB/6.0	10/91	*
MYTIMEMANAGER	4.0	1MB/6.0.3		*
NETMINDER ETHERNET	2.0	2MB/6.0		*
NETWORK BUNDLE FOR THE MAC	3.0	512K/3.2		*
NETWORK SUPERVISOR	2.0	2.5MB/6.0.3		*
NISUS	3.06	1MB/6.0.2		*
THE NORTON UTILITIES FOR THE MACINTOSH	1.1	1MB/4.2		\$19
NOW UTILITIES	3.0.1	1MB/6.0.4	2/92	\$49
NUBASE FOR THE MAC	1.3	1MB/4.1	1/92	\$75
OMNIPAGE	3.0	4MB/6.0		\$25
OMNIPAGE PROFESSIONAL	1.0	5MB/7.0		*
OMNIS SEVEN		2MB/6.0		*
ONCUE II	2.0	512K/6.0.2		\$34.95
ON LOCATION	2.0	1MB/6.0.5	3/92	\$25
ON SCHEDULE	2.0	1MB/3.0		*
PANORAMA	2.03	1MB/6.0	5/92	*
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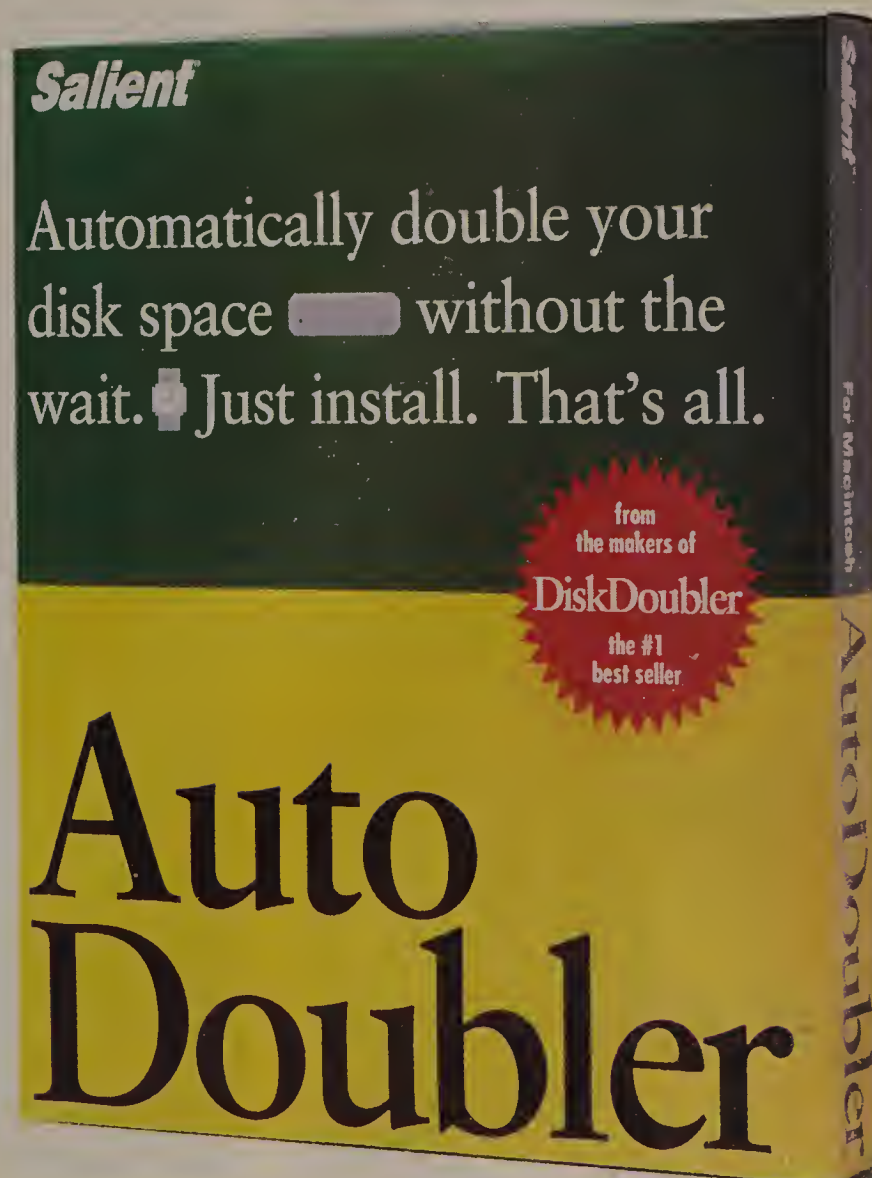
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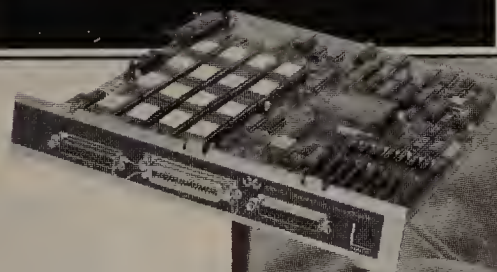


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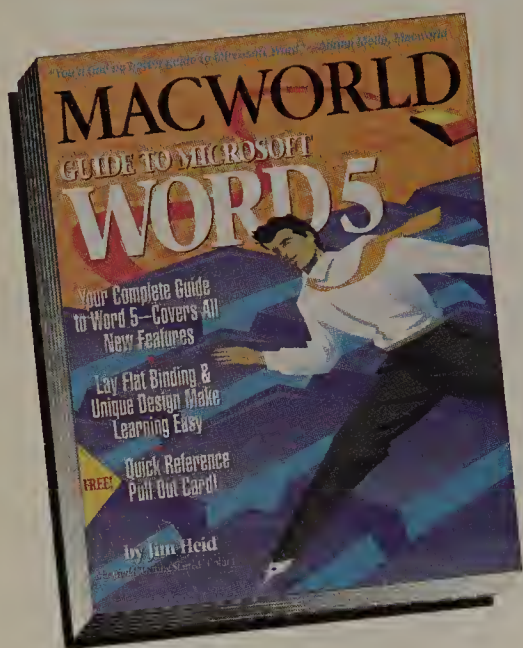


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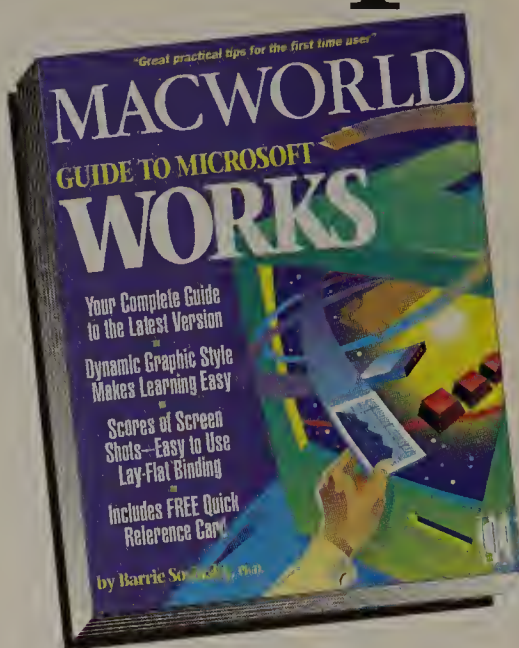
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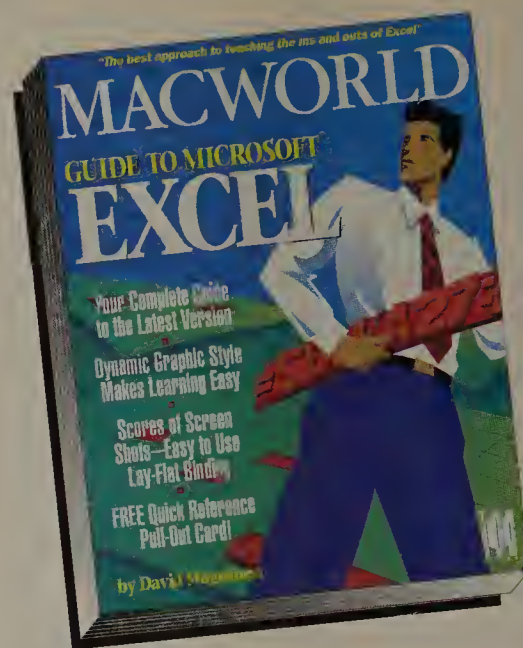
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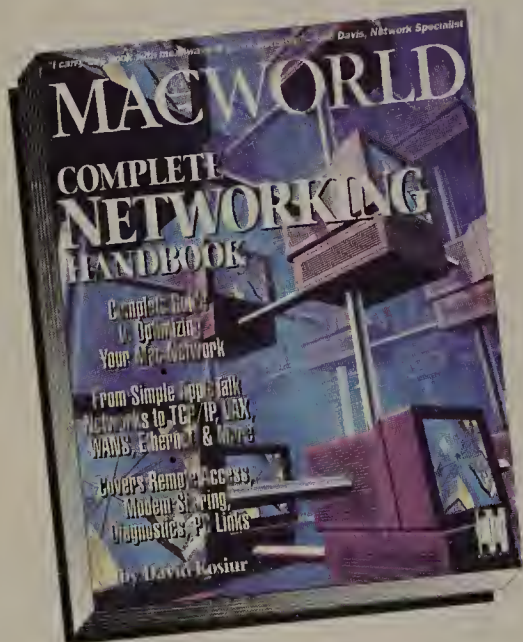
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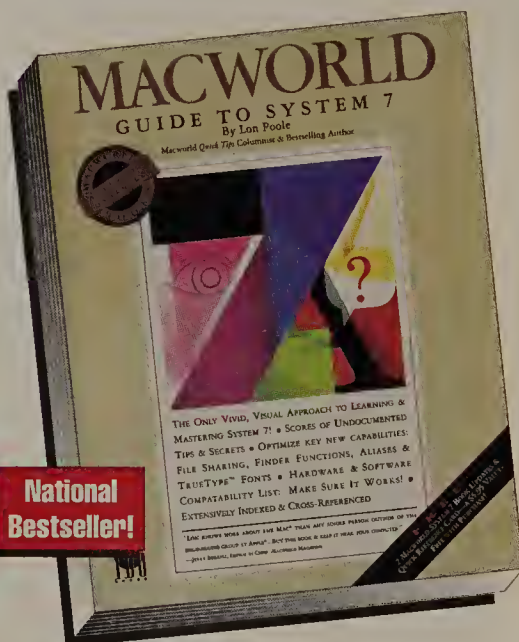
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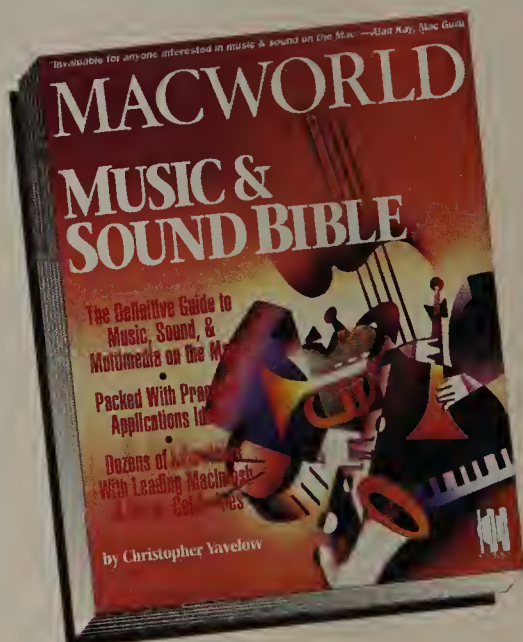
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Lab Notes

Accelerators: How Compatible Are They?

BY MARK HURLOW

FOR THIS YEAR'S ROUNDUP OF 68030 and 68040 accelerator boards, "The Need for Speed," Macworld Lab spent considerably more time on performance testing than for last year's batch. Aside from having many more accelerators and CPUs to test, incompatibility was the major problem. While we found a few accelerator boards to be compatible with all of our application tests, about 40 percent of the products had incompatibility problems in at least one of our testing categories, including software (such as Microsoft Word 4.0 and Excel 3.0); video boards; CPUs; and System 7 features, such as 32-bit addressing and virtual memory.

Hardware Incompatibilities

THE FIRST AND most important compatibility issue is whether an accelerator board can peacefully coexist with your hardware. For example, while Radius's multiprocessing board, the Saturn V, runs on the Mac IIfx, the Radius Rocket (on which the Saturn is based) doesn't. And although the Rocket and Impulse Technology's Performance/040 are advertised as Mac II, NuBus-based 68040 accelerators, they're not compatible with all NuBus-based CPUs. If you plan to upgrade a Mac II with either of these boards, make sure you have the Rev. B ROM set—a ROM upgrade obtainable from Apple dealers—which makes it possible to transfer 32-bit data over NuBus. The Rev. A ROM, which is incompatible with the Mac II, limits the CPU's addressing to 1MB on each NuBus slot, compared with 256MB with the Rev. B ROM. The Performance/040 also requires a Paged Memory Management Unit (PMMU) on the Mac's logic board.

Some 68040-based accelerators, including the Radius Rocket and the Perfor-

mance/040, also had trouble working with some NuBus boards. We found Fusion Data Systems' TokaMac SX 25 (on the IIsi) was incompatible with the SuperMac Spectrum/24 PDQ display board; the Rocket wouldn't work with some RasterOps video-interface boards (especially the ones for 13-inch monitors); and the Truevision video board was incompatible with the Performance/040. Most video boards require a firmware revision to work with 68040 accelerators because to transfer data most video boards rely on an undocumented feature of the 68020 and 68030 processors called *byte smearing*, which the 68040 boards do not support. Make sure you check with the accelerator board vendor about hardware compatibility with your existing system.

The introduction of the Mac II made possible 32-bit addressing, which enables the CPU to access up to 1 gigabyte of RAM. However, the ROM that came with the Mac II—and subsequently the SE/30, IIfx, and IIfx—is unable to access more than 8MB of physical memory. To take full advantage of 32-bit addressing on these machines requires Mode32 (available free from Connectix Corporation, Apple dealers, bulletin boards, and user groups). But not all accelerators support Mode32. For example, without RocketWare 1.3 (which should be available by the time you read this) the Radius Rocket cannot access more than 8MB on the accelerator board when installed on a Mac II, IIfx, or IIfx. The TokaMac SX 25 (on the SE/30) is also incompatible with Mode32.

None of the Classic and SE accelerator boards support 32-bit addressing, since none of the compact Macs (the

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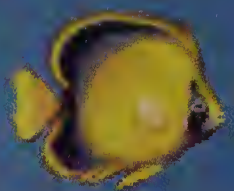
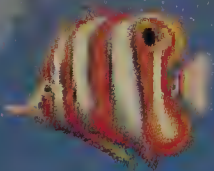
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512K, Plus, SE, and Classic) have 32-bit-clean ROMs to start with. To enable these 68000-based compact Macs to work with 32-bit addressing would require a major revision of the ROM, not a simple task.

To break the 4MB limit of the 68000-based machines—the Plus, the SE, and the Classic—some accelerator vendors are shipping their compact Mac 030 accelerator boards with Connectix's Compact Virtual. If you need to access more than 4MB of RAM on a 68000-based compact Mac, get an accelerator board that supports Compact Virtual 3.0, which should be released by the time you read this. Like System 7's virtual memory, Compact Virtual enables a CPU to use a SCSI storage device (such as a hard drive) as an extension of physical RAM. But unlike System 7's virtual memory (VM), Compact Virtual allows you to access up to 16MB of physical RAM from the accelerator board itself.

Due to ROM limitations, System 7's VM will not run on a 68000-based compact Mac, not even one equipped with a PMMU chip. The beta version of Compact Virtual 3.0 that we examined lets an accelerator board access up to 16MB of virtual or physical memory on a compact Mac and includes some nice features not provided by Apple's VM, such as Disk Saver and RAM Disk. Disk Saver is a disk-partitioning scheme that's more efficient than System 7's VM. For example, if you have an 8MB CPU and need to access 10MB, with Disk Saver you need to allocate only 2MB of disk space of VM; System 7's VM requires 10MB of disk space. RAM Disk shortens access time by using physical RAM as disk storage. Because it's nonvolatile, it will survive a restart.

Although our tests showed that Dove Computer's MaraThon Racer 030, Day-Star Digital's PowerCache, and other 68030-based accelerators for modular Macs had no trouble running System 7's VM, the 040-based boards don't support it at all. Some vendors are trying to get virtual memory to run on their 040 accelerators. Impulse, for example, is talking with Connectix about creating a version of Virtual that will be compatible with the Impulse board. Fusion Data, meanwhile, promises virtual memory support in the near future, either by reengineering some of the board's start-up routine or through Virtual. Taking a different approach, Radius recommends its users purchase more RAM, since virtual memory is considerably slower than real memory.

A word of caution: If you think you'll need virtual memory, don't buy an accelerator with a 68EC030 or 68EC040 processor; these lack the PMMU required to run virtual memory.

While 030-based accelerators for

modular Macs have no trouble running A/UX, Apple's implementation of the Unix operating system, 040 boards don't support A/UX at all. Fusion Data Systems is currently working with Apple A/UX engineers to determine the feasibility of running its PDS-based 040 accelerator boards with a Quadra-compatible version of A/UX, but neither Radius nor Impulse Technology has any plans to support A/UX in the near future. Because A/UX, like virtual memory, requires complete control of the 68040 processor's Memory Management Unit, and each of these NuBus-based boards implements its own memory management for its on-board memory with the 68040's MMU, supporting a radically different operating system would mean having to rewrite a lot of memory-management routines.

Software Incompatibilities

IN ADDITION TO HARDWARE AND SYSTEM incompatibilities, many accelerators had trouble running with certain applications. Some applications, like Excel 3.0, were incompatible with a few 68030-based accelerator boards. Others, like Word 4.0 and PageMaker 4.01, were unable to run with 68040 accelerators. Still other applications, like 4th Dimension, failed only on specific boards—in this case, the Impulse Performance/040.

The most common problem we found specific to 68030 boards was with Microsoft Excel running under System 7.0.1. At first we suspected the culprit was the SANE trap, which intercepts SANE calculations, translates them into floating-point calculations, and diverts these floating-point calculation instructions to the 68882 floating-point unit, or FPU (SANE, or Standard Apple Numerics Environment, is an extension to the Mac Operating System). However, the problem turned out to be HWPriv (Hardware Privilege), a system trap Excel 3.0 uses that Apple changed in System 7.0.1. This problem exists only on compact Macs that have an 020 or an 030 accelerator, and most vendors already have patches for it.

Another Microsoft product, Word 4.0, had compatibility problems, but only on 040-based accelerators. To run Word 4.0, you need to turn off the accelerator (through a control panel). To take full advantage of 040 processing power, you can upgrade to Word 5.0 or get Word 4.0e, the free maintenance version of 4.0.

Another problem was that most 040 accelerators couldn't open PageMaker 4.01 in copy-back mode, an instruction and data-caching scheme in which information written to the cache is updated in main memory only when there is a spe-

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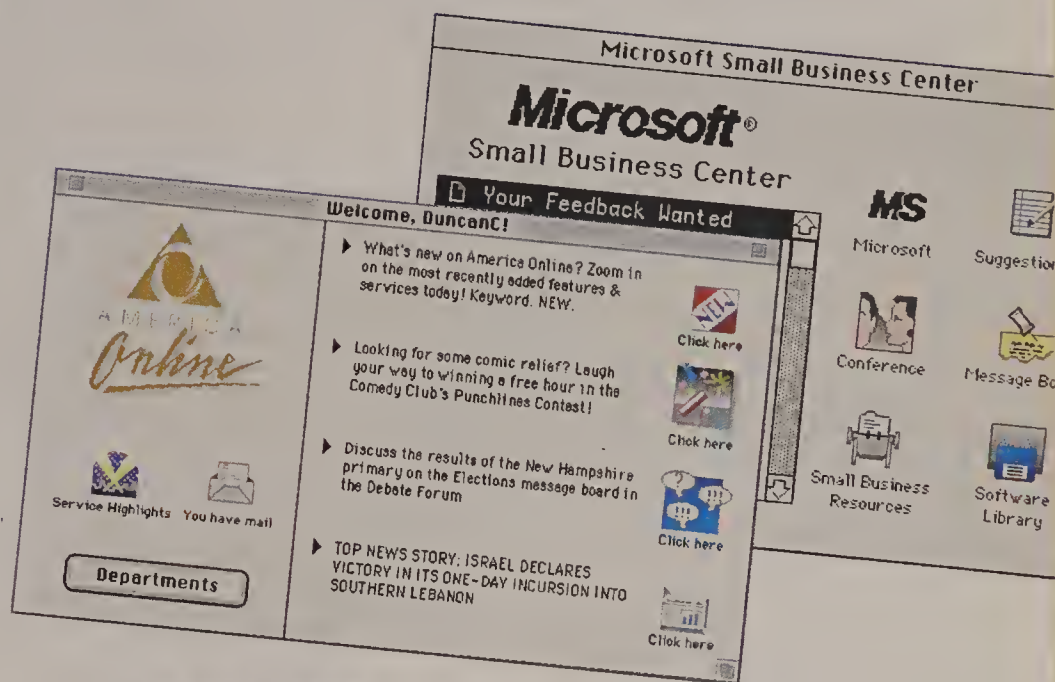
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cific instruction to do so. This can be avoided by removing most of the PageMaker filters from the System Folder. PageMaker 4.2, an \$85 update, eliminates this problem.

A number of vendors we contacted told us that most 040-based accelerators have trouble with multisegmented cdevs (control panels in System 7), INITs, DAs, and filters compiled with older versions of Think C and Think Pascal, which used 68020/68030-specific instructions. Most software compiled with the older version of either Think C or Think Pascal should have updated versions available by now.

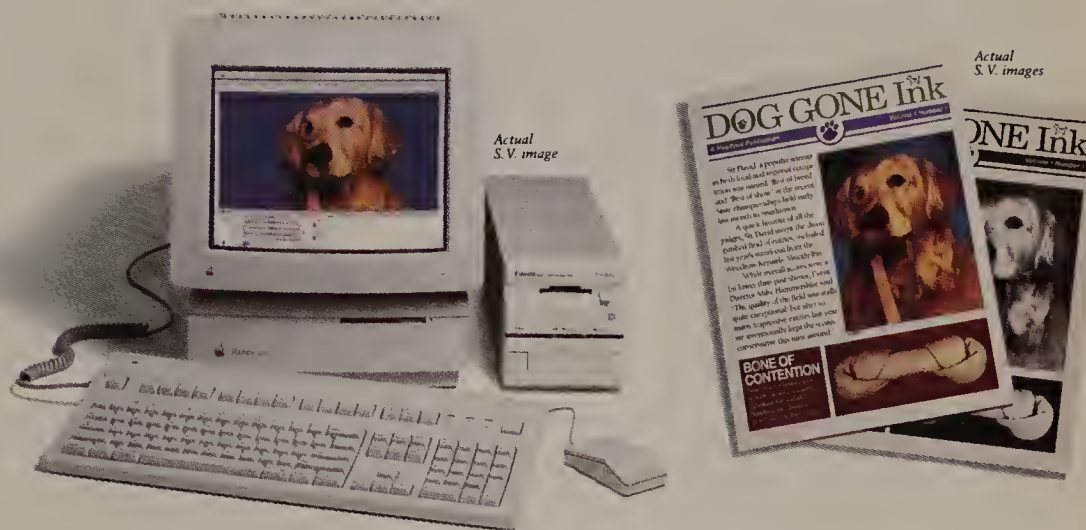
A few applications failed to run properly on only the Impulse Performance/040. We had to turn off copy-back mode to run 4th Dimension with the Impulse. The board's software reports the board as an 030, which makes 4D run under write-through mode, a scheme that runs more slowly than copy-back. Meanwhile the 040 board is running under copy-back mode. This mismatch causes 4D to quit. Other problems specific to the Performance/040 board include failure to perform calculations in Mathematica and freezing when quitting from MacDraw Pro. Impulse should have released a bug fix by the time you read this.

According to most of the accelerator vendors we contacted, many sound programs (such as SoundEdit) that avoid the Sound Manager by writing directly to the Mac's sound chip are likely to be incompatible with most 030 and 040 boards. Games with copy-protection schemes (which include self-modifying code) don't work with an 030 or 040 accelerator because the board's instruction cache prevents the modified code from being updated in RAM. Games that directly access logic board hardware, such as the video frame buffer or the sound chip, won't work either. Also, games that make assumptions about the environment of the CPU (for instance, assuming that if a 68030 is present it should have Color QuickDraw) might also fail.

Compatibility issues have existed since the introduction of the Mac II, and accelerators will continue to have such problems whenever they encounter new system software or new applications. While most accelerator vendors try to solve incompatibility problems, you can't expect them to find—or be able to solve—them all. So before you spend your hard-earned money (or your boss's smart-earned money) on an accelerator, you should first try out the board with your favorite applications, screen savers, and games to see if they run. If you can't do that, call the accelerator board vendor and ask for a compatibility list. **m**



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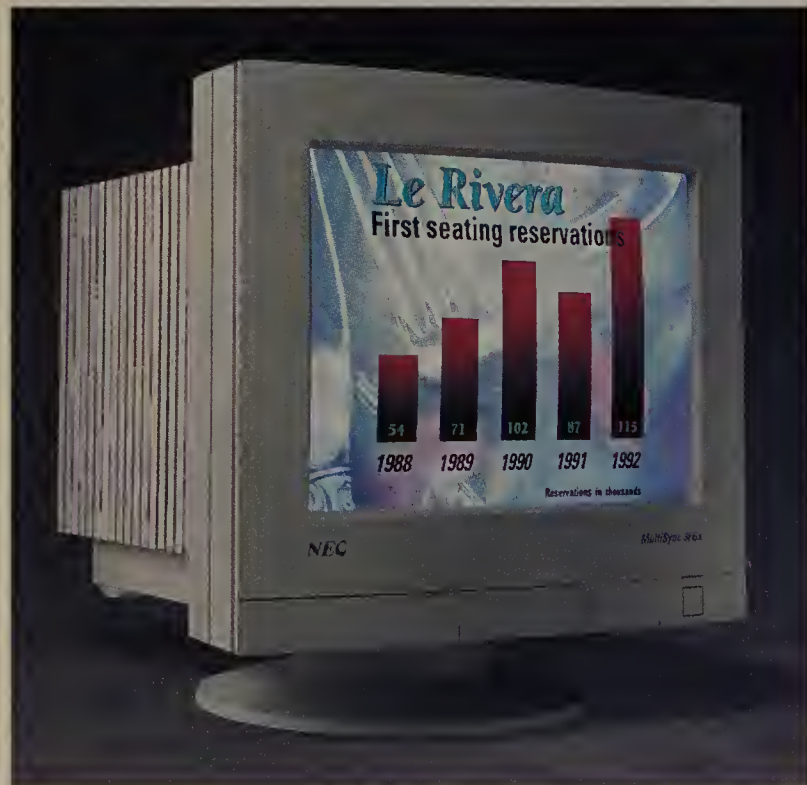
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BBP2465A 88mb Cartridge (Uniform, 1-yr. war.) . \$139.00

BBP2465B 44mb Cartridge (Uniform, 1-yr. war.) . \$79.00

BBP2465C 88mb Cartridge (Format, 5-yr. war.) . \$149.00

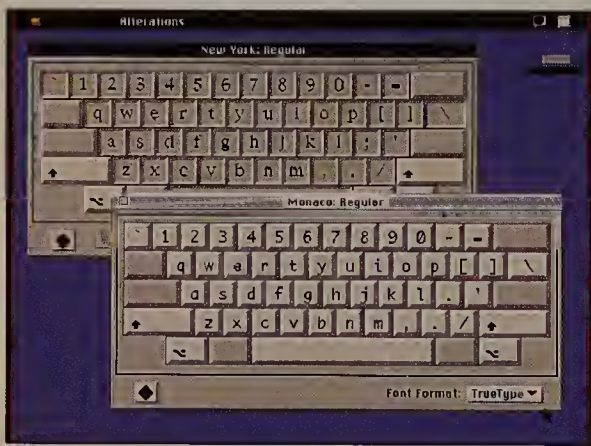
BBP2465D 44mb Cartridge (Format, 5-yr. war.) . \$95.00

Enhance And Modify Your Fonts With Amazing Results!

REVIEWER'S NOTEBOOK: Now anyone can get typographic-quality effects and enhancements using their existing type, with FontMonger, the super fast, simple-to-use type customizer. Modify a wide range of your type's characteristics, including the ability to merge individual characters to create custom faces. Modify existing typefaces into all small caps and use characters you've never been able to access before.

This easy-to-use utility can save you hundreds (or even thousands) of dollars by converting PostScript Type 1 (for use in Adobe Type Manager) and Type 3 fonts to the advanced new TrueType format.

Here's another fascinating FontMonger capability: you can actually merge characters from several font families, to create unique small caps, composite characters, customized faces and logotypes.



Combine typefaces, remap keyboard characters or convert between type formats.

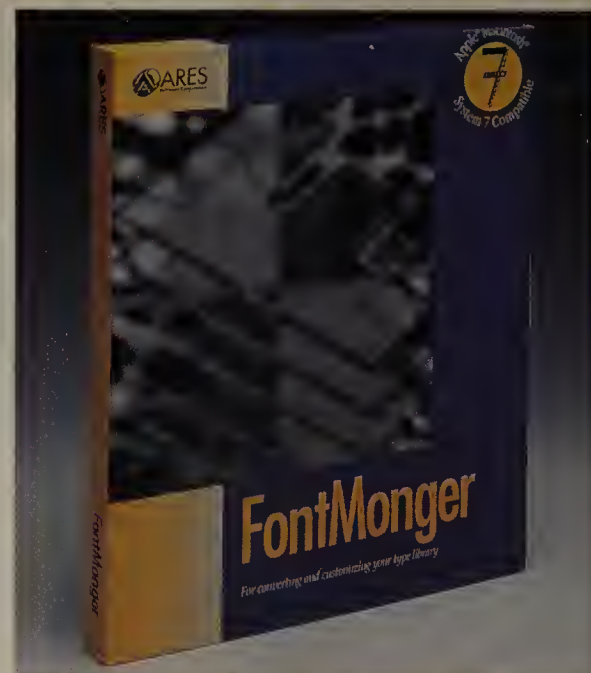
FontMonger also offers support of Adobe Illustrator and Aldus Freehand files. You can create or modify characters within programs and build these modified characters back into a font. It's fast, easy and very handy when using multiple programs. FontMonger's type modification tools provide a vast assortment of intriguing capabilities including: access to unencoded characters, creation of oblique characters, generation of superscript and subscript characters along with generation of slash and bar fractions (some of which have been previously hidden, others you probably never knew you had).

Using FontMonger, you can convert fonts one face at a time, as you need them, or in batches so your entire library is at your service. Just one step converts the batch. In addition, you can control the character widths of your fonts (the space between characters) the horizontal and vertical scaling, the slant and character width.

Outline Fonts. Outline fonts that describe the lines and curves which make up their characters. They can be used to draw characters at any size on any screen or printer. With the arrival of Adobe Type Manager (ATM) and Apple's System 7.0, you can now use outline fonts throughout your Macintosh system. Fonts you use this way must be in PostScript Type 1 format for ATM, and in TrueType format for System 7.0.

TrueType. The TrueType font format was developed by Apple for System 7.0. The format has been adopted by Microsoft for use with Windows.

Type 1. Before 1990, only Adobe could produce fonts in PostScript Type 1 format, so if you wanted to



use ATM you had to buy Adobe fonts. Now, the Type 1 font specifications are publicly available, and you can buy Type 1 fonts from many vendors.

Type 3. Until the Type 1 format was made public, non-Adobe PostScript fonts were in the less-capable Type 3 format. Type 3 fonts are usually slower to print, produce lower-quality results and do not work with ATM. You may never need to convert any fonts to Type 3 format with FontMonger (although you can). Instead, you will probably want to convert Type 3 fonts to Type 1 and TrueType formats.

ARES FONTMONGER

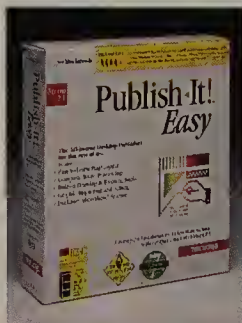
BBP2415 FontMonger \$59.95
Requires Macintosh Plus or newer; 1 MB of memory; two floppy drives or a hard disk; System 6.0.2 or later.

Upgrade Or Switch to Publish-It! Easy 2.1 For Only \$99.

REVIEWER'S NOTEBOOK: If you're about to enter the world of Macintosh desktop publishing, or if you're an experienced user who wants fast, pro-quality results without dredging through hundred-page manuals, Publish-It! Easy is the award-winning, System-7 Savvy product that MacWorld magazine calls "...the Swiss Army Knife of desktop publishers". Now for a limited time, you'll be able to switch or upgrade to this 4-and-a-half mice rated package for only \$99 — if you currently own a desktop publisher or word processing program. This is a \$150 savings off the suggested retail price of \$249.95. Simply send us the title page of the DTP or word processing manual you are currently using, and you'll own Publish-It! Easy Version 2.1 for only \$99. Publish-It! Easy is also available in the new Corporate Network File Server Version.

The printed page. It can be an adversary or a joy. If you've got new Publish-It! Easy loaded on your Mac, you'll enjoy the process of laying out a page — and produce handsome newsletters, brochures, catalogs, reports, bulletins, advertisements, flyers, coupons and more! With the toolbox of advanced, easy-to-use features such as The Slide Show (complete with dozens of features and effects, outperforming some stand alone packages!), instant thumbnails (view and edit up to 100

pages), built-in database and mail merge, spell checker and thesaurus, your ideas will look extraordinary on paper as well as on-screen. Draw, paint, edit text, add graphics instantly and use a host of other state-of-the-art publishing tools with sleek controls. In fact, this one program eliminates the need and expense of having separate drawing, painting, word processing mail merge and presentation software — that's how incredibly full featured this package is! And don't worry — Publish-It! Easy doesn't punish you for mistakes or experimentation — it provides 5 levels of Undo to get you right back to the beginning, so you can explore other creative avenues. Print your quality pages on any Chooser-selectable printer.



PUBLISH-IT! EASY 2.1

BBP2712 Publish-It! Easy 2.1 (Upgrade or Switch Offer) \$99.00
BBP2470 Publish-It! Easy 2.1 \$135.95
BBP2720 Publish-It! Easy 2.5 Promotional Pack (One Network File Server, One-Node Lan Pack, plus another One-Node Lan Pack FREE) \$399.00
Any Macintosh running System 6.0 or later with 1MB RAM.

Advanced Grayscale Image Enhancement.

If you've got a scanner, this product is for you. A professional-quality image manipulation product with scores of tools, filters, masks, retouching features and more. Supports TIFF, PICT and EPS. Features a customizable tool palette, advanced magnification features and input/output device calibration for best-possible reproduction. It is a true second-generation grayscale image enhancer, so you have complete control of your scanned images, not just two or three options. Create images that you simply couldn't before — clean, crisp halftones from imperfect originals. Grab just parts of a photograph, create a montage, filter images for reproduction with higher quality than you've ever seen before. In use today by graphic designers, scientists, publishers and professional retouchers.



ENHANCE

BBP2447 ENHANCE \$230.00
Macintosh SE30, LC or Macintosh II family of computers with 2 MB RAM; 8 bit color video card with gray scale or color monitor recommended.

Create Full 3-D, Photorealistic Images!

MacRenderMan and Showplace (bundled together in this offer) represent the finest software available for 3-D image creation, viewing and manipulation. MacRenderMan allows you to create incredibly realistic images, while Showplace allows you to import those images and create scenes, with complete control of lighting, texture, backgrounds, vantage points and dozens of other effects. Altogether amazing, surprisingly easy and fast. In fact, RenderMan was used in creating the academy award winning film, Tin Toy. Impressive results can be achieved in a short time, but if you get the urge, you can get crazy with these products and never be seen or heard from again...

ALSO AVAILABLE IN CD-ROM VERSION

MacRenderMan and Showplace applications, complete online documentation for both products, a gallery of images created with Pixar products and a sample of Pixar animation all on one CD-ROM!



MACRENDERMAN & SHOWPLACE

BBP2410 Showplace & MacRenderMan Bundle \$595.00
BBP2411 Showplace & MacRenderMan CD .. \$315.00
Please call for system requirements.

The Art Of The SCAN



REVIEWER'S NOTEBOOK: The Logitech series of advanced mice and scanners has won acclaim from the press — and thousands of loyal users. No other manufacturer engineers so much precision and innovation into their products. From an incredibly sharp hand scanner, to the all new breed of "programmable" mice, they're a pleasure to work with. We put the ScanMan 32 hand scanner through it's paces, performing over 50 scans of various black and white images — photos, line art, logos, type, illustrations — even poor-quality photos. The ScanMan 32 features 32 gray scale performance, with adjustable scanning resolutions from 100 dpi for quick scans; up to 400 dpi for magnificent finished images. Use scanned images in word processors, multi-media, desktop publishing, HyperCard, OCR and more. Hold a Logitech device in your hand and you'll notice the superior craftsmanship, the precise movement of the rollers and the extra large scanning window so you can see as you scan. Scan instead of re-keying data: capture text (with OCR software) with crisp, clean results.

The Science of Scanning. Logitech technology destroys the old barriers of scanning, increasing the speed and accuracy of anything you scan. Superior image quality, with the ability to produce halftones for reproduction. The set of output controls provide the best possible results on any printer or monitor screen. Its 4" wide scanning area allows full-page scans with just two quick passes.

And Logitech's rugged construction and precision roller system allows straight, unwaivering scans. No curving, no skipping. The scanning speed indica-

tor controls the movement for perfect scans every time. There are three settings for scanning photos and another for scanning line art. Its shape is perfect, its weight and components distributed equally for balance. All of which makes getting an image from paper—into your Mac, simple and easy.



The ScanMan 32 gives you a free set of software editing tools, including a 32 gray scale palette for detailed retouching. There's also a handy dimension box and tear off tool palette; use them alone or incorporate them as a desk accessory. Pop up real-time brightness and contrast controls, refine images with amazing flexibility, rotate, flop and invert images. Save your scans in a variety of formats, including MacPaint, TIFF and PICT).

Here's What You Get: The ScanMan 32 contains everything you need. The Model 32 Gray Scale scanner, SCSI interface box and cable, power supply adaptor, ScanMan software, version 2.0, CatchWord Pro OCR software and complete user guide. Fast, easy, compatible — and powerful — the ScanMan 32 is a superior hand scanner.

Included with ScanMan 32 — CATCHWORD PRO: Powerful Optical Character Recognition (OCR) software that allows you to capture printed, hard-copy data by scanning it, rather than typing it. But, without quality software and a high quality scanner (like the ScanMan 32), scanning text won't work properly. "Dirty" scans produce unwanted characters and commands, requiring enormous cleanup — creating more work than rekeying.

CatchWord Pro delivers an amazing 99% accuracy in OCR testing, used in tandem with the ScanMan 32. CatchWord Pro is compatible with popular word processors, spreadsheets, databases and desktop publishers — so you can scan information directly into your application and use it immediately! Different typesets and

sizes are no problem, any printed characters, in any size of typestyle are instantly recognized. It will even automatically convert two scans into one, full-page image.

What about larger, memory-intensive photos and pages packed with small type — don't they slow my system to a crawl? The answer is "no" and only Logitech can say that. While other scanners are notorious for system slowdown, all of your ScanMan 32 scans zip along with Logitech's ingenious memory management features that automatically swap image data between your system's RAM and hard disk.

The instrument itself is a masterpiece. From the genius of the respected industrial design firm, Frogdesign — also responsible for the new line of NEC monitors and other distinctive hardware products, the ScanMan 32 is different from the ground up. First, you'll notice that it's heavier, with precision rollers that provide more "grip" along with a superior guidance system for light-touch control. All of which means you can scan quickly and accurately — once — and capture the image perfectly. While many other hand scanners rely on you to move in a straight line as you scan, the ScanMan 32 provides fully balanced, direct movement.

Using the ScanMan 32, you can create instant layouts, experiment with backgrounds and special effects. Add text and explore sizing and cropping options within seconds. That's why the hand scanner has caught fire in the design world: its ability to let you see many different visual combinations.

Businesses use scanners to capture text as described above and for keeping archival records of paper documents with instantaneous access. Logitech's advanced technology gives you more flexibility, creative tools and value than any other scanner.

Although there are two basic scanning modes in ScanMan, there are in fact three ways of scanning an image: Line art mode, Gray mode, or Mixed mode.



Line Art Mode.

Line Art mode is useful for scanning black and white line drawings, diagrams, and text. This mode produces high-contrast images in black and white.

Gray Mode.

Gray mode is useful for scanning photographs, color images, and drawings where the high-contrast black or white character of Line Art mode detracts from the quality of the image.

Desktop publishing programs enable you to combine your ScanMan images with text. Most of these programs accept either PICT or TIFF format files. PICT format enables you to work with compact files, although you won't be able to change the display format of the document or the grays.

TIGER SPECIAL

ScanMan 32 with
CatchWord Pro &
MouseMan MAC

**ONLY
\$389**

LOGITECH

BBP2509 ScanMan 32 with CatchWord Pro	\$359.00
BBP2598 ScanMan 32 w/CatchWord Pro and MouseMan MAC	\$389.00
BBP2511 TrackMan MAC	\$79.00
BBP2510 MouseMan MAC Upgrade	\$49.95
BBP2220 ScanMan 32 w/Digital Darkroom	\$289.00

ScanMan 32: Macintosh Plus or better running System 6.0 or later. Hard disk recommended. **TrackMan/MouseMan:** Any ADB Macintosh running Macintosh, A/UX or X Windows Operating Systems.

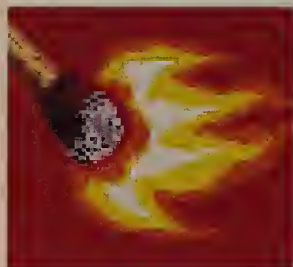


Actual unretouched scan.

The Intelligent Desktop

REVIEWER'S NOTEBOOK: Although OnCueII contains several individual features (each of which could be standalone products), one in particular caught our eye as an incredible time saver: KeyLauncher. It allows you to launch any application from the keyboard, without opening layers of folders — by simply typing all or part of its name! That one capability can save an incredible amount of time by eliminating time-consuming steps. It's worth the price of OnCueII alone — but there's much more...

OnCueII satisfies the power-user in us as elegantly as it satisfies our need for easy-to-use utilities that perform as promised and increase productivity. So it's great for anyone. In seconds, you can personalize your menu configuration for maximum speed and efficiency. Just click to open an application, group documents together that will be used for a specific project, return to work on a recently-used document by retrieving a list of up to 100 files you've used, and launching any of them immediately. No other file and application manager gives you this degree of functionality. There's even a cure for the "missing application" message using OnCueII's unique MatchMaker feature. With it, you can launch files that have missing applications by assigning another application — any one you choose!



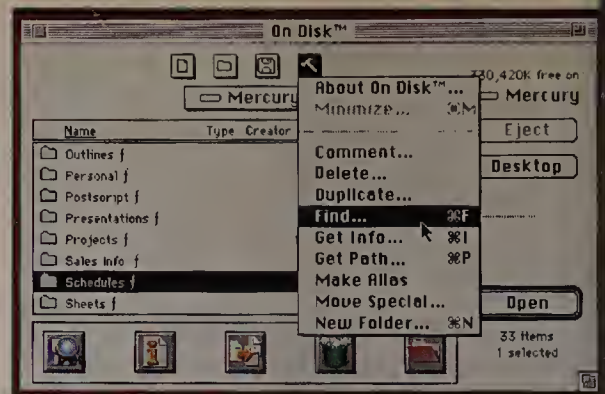
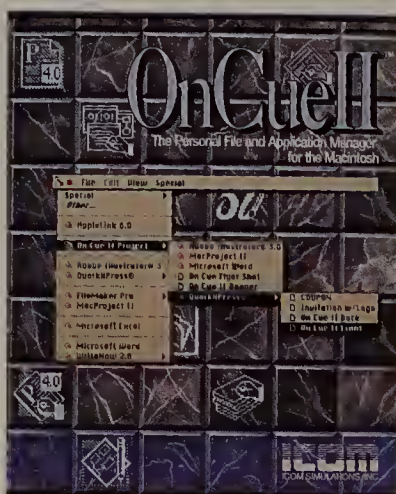
OnCueII also provides powerful, easy-to-use tools to help you instantly find seemingly lost files. You can con-

duct blistering fast searches by file name, file format (TIFF, PICT, etc.), creator application, dates created or modified, file size or any combination. With this powerful search feature on your side, you'll never misplace another file. Guaranteed. And with OnCueII's amazing file management capabilities, you'll be able to instantly find, get info, copy, move, delete, and rename files/folders from within any application — and without using the Finder. It doesn't get any more convenient than that.

And there's more! The On Startup feature gives you complete control of the programs that load when you turn on your Mac, like system extensions and control panels. You simply define the priority and groupings and OnCueII takes care of the rest.

All of which makes OnCueII one of the most important new products to come along in years, giving you capabilities you've probably wished for but never thought possible. And we've just scratched the surface of OnCueII's vast potential: it contains ten other time-saving features that users have screamed for. This is one product that does it all.

Eliminate



Instant file management — from within any application!
Find, get info, copy, move, delete, even rename files or folders without using the finder!

time-consuming steps with the following versatile features:

- **On Cue II.** Instantly launch any file or application, or simultaneously launch a group of files and applications — without opening layers of folders — all with a single mouse click.
- **MatchMaker.** Conveniently launch files that have missing applications by assigning another application of your choice.
- **File Search.** Quickly locate files by using the following search criteria: file name, file format, creator application, dates created or modified, file size, or any combination of these criteria.
- **On Startup.** Easily manage programs that load when you turn on your computer (e.g., system extensions) by defining the priority and groupings in which these programs are loaded.

...Plus 13 other time-saving features!

ONCUE II

BBP2400 OnCueII \$55.00
Any Macintosh computer running System 6.0.4 or later with at least 1MB RAM.

Full-Motion, Interactive Sherlock Holmes Mysteries!

Over 90 Minutes Of Adventure On One CD!

REVIEWER'S NOTEBOOK: An absolute must for electronic game fans, Sherlock aficionados and deductive-reasoners! Sherlock Holmes, Consulting Detective is the only game we've ever seen that features FULL MOTION VIDEO. You actually interact with the on-screen characters, embarking on three different cases with the super-sleuth himself, along with Watson and an intriguing collection of victims, suspects, generals, beautiful women and jealous sisters. It's a fascinating new technology. The sound is incredible, taking advantage of your MAC's full capabilities. Hours of fun and intrigue. The cases are well written adaptations of characters licensed from the Sir Arthur Conan Doyle estate. You interact with the characters. Your interrogations lead to valuable information and the evidence you uncover leads to clues needed to help Scotland Yard nab the villainous murderer. Members of the Tiger staff first saw this disc at the CD-ROM Expo in San Jose last summer. We knew then that this one was



destined to become a classic. If you've got a CD-ROM reader, you'll love it. This multimedia, full-motion blockbuster is worth it!

For the first time ever, over 90 minutes of full-motion video brings Sherlock Holmes to life. This revolutionary CD gaming experience lets you match wits with the super-sleuth himself. Guide Sherlock and Watson through the streets of London to interrogate suspects and solve three intriguing murder mysteries! Just slip in the CD and go to work.



The Case of the Mystified Murderess.

Two sisters. One beautiful. The other quiet and plain. A single man. Tall, handsome... and dead. Who did it? Was it jealousy or was it greed? Could the

murder be tied to a rash of burglaries causing panic in the upper-class communities of London?

The Case of the Mummy's Curse.

Four men found dead. Some say the murderer is a 4000 year old Mummy exhumed during an archaeological dig in Katebet, Egypt. Were their murders simply coincidental or were these men cursed from the crypt? Great sets and effects. You — and Holmes — try to unravel one of the century's most bizarre murders.

The Case of the Tin Soldier.



Waterloo, 1815. Power and Passion. He was an officer but not a gentleman. Now, years later, the retired General has been murdered, a jewel stolen, and a king's ransom waits to be claimed. Who killed General Armstead and why? Holmes enters the scene. This case is a baffler, there are no solid clues.

MULTIMEDIA CD-ROM

BBP2703 Sherlock Holmes, Consulting Detective CD-ROM \$59.95
Sherlock Holmes: requires CD-ROM reader and will run on a MAC LC or greater.

The Integrated Package That's Truly Integrated.

Work With All 7 Programs At Once!
It's Seamless... It's BeagleWorks!

REVIEWER'S NOTEBOOK: *Beagle Bros. Software has consistently offered up some of the finest products we've seen for the Apple Computer. Each is clean, powerful and easy to use. Now, Beagle Bros. assembled a product that offers an integrated software program with seven modules. Beagle Bros. went back to the drawing board to create a new concept of integration, allowing users instant access to all information in the modules. Their efforts have produced In-Context Editing™, which links the word processor (with speller/thesaurus), spreadsheet, database, charting, drawing program, paint program and communications. This high level integration makes life very easy. Link documents and combine data from any of the individual modules into a single document and make changes without ever leaving that document. Feature for feature, BeagleWorks beats ClarisWorks, GreatWorks and Microsoft Works in every area we tested. It's the only one of the four that is System 7 SAVVY, so it takes full advantage of Publish & Subscribe, Balloon Help, TrueType, AppleEvents, Virtual Memory, 32-bit file addressing and color icons. An incredible value, ready-to-run for users of any expertise level. Great starter application that won't be quickly "outgrown."*

A new definition of integration. For example, you can actually combine information from any of the seven modules into a single document. Or create new information in another module without leaving the module in which you are currently working. And with the innovative In-Context Editing, when information is changed in one document, the information in the linked documents changes with it. Automatically.

Publish & Subscribe information from any of the modules. BeagleWorks includes some powerful desktop publishing features like wrapping text around objects, setting multiple columns on and off anywhere on the page, and reduction and magnification as well as page preview in any module.

You'll love the full-featured Spreadsheet that allows you to create up to 256 columns and 16,385 rows. A powerful tool bar and time-saving recalc automatic summation features. The charting modules creates robust, 256-color line, bar, column, area, scatter and exploded pie charts. The database module allows 16,000 records per file, 256 fields per record and easy mail-merge. Sixty-four built-in functions are all at your command and BeagleWorks provides 32 report formats for your data.

Wanna' draw? Just pop open BeagleWorks' draw module and choose from a palette of tools, colors, patterns and line widths and shapes. The streamlined, tear-off menus make it a pleasure to work with. While you're in a creative state, zip into the paint module and get crazy with a host of spectacular studio tools — and some nifty special effects as well. Airbrush, spray can, paint bucket, pencil, line and more. Provides 256 custom colors and 128 patterns.

When you're ready to connect your Mac to the world, BeagleWorks' communications module makes use of Apple's Communications toolbox to give you powerful connectivity! It stores commonly used phone numbers with a variety of convenient settings. Autodial, autoanswer, uses a modem or direct serial connection.



In-Context Editing™ — Allows editing of one file from within another by simply double-clicking.

Multiple Columns — Can be turned on or off anywhere on the page.

Automatic Irregular Text Wrap — Text takes on shape of the graphic.

Common Tool Bar — Frequently used tools are easily accessible.

Word Processor: Automatically wrap text around objects; format in multiple columns; graphic ruler with tool bar for quick formatting; multiple headers and footers, custom styles and more; Microlytics® spelling checker and thesaurus.

Spreadsheet: Apply a different type style to any cell; create up to 256 columns and 16,384 rows; tool bar allows easy access to formatting.

Chart: Chart types include Line, Bar, Column, Area, Scatter, Exploded Pie and more; 256 custom colors.

Database: Manage databases with more than 16,000 records per file and 256 fields per record; mail merge with word processor; 64 built-in functions; up to 32 report formats of your data; tool bar provides easy access to formatting and alignment.

Draw: Tear-off menus for tools, colors and patterns.

Integrated Software: Who Leads The Pack?

FEATURES	BeagleWorks	ClarisWorks	GreatWorks	Microsoft Works
System 7 Savvy	YES	NO	NO	NO
In-Context Editing™ (multiple documents)	YES	NO	NO	NO
Paint module	256 Colors	NO	Bk & Wht	NO
Common tool bar w/module-specific tools	YES	NO	NO	NO
Automatic irregular text wrap	YES	NO	NO	NO
Multiple Columns can be turned on/off anywhere on the page	YES	NO	NO	NO

BeagleWorks is the clear winner overall when it comes to true integration and powerful features.

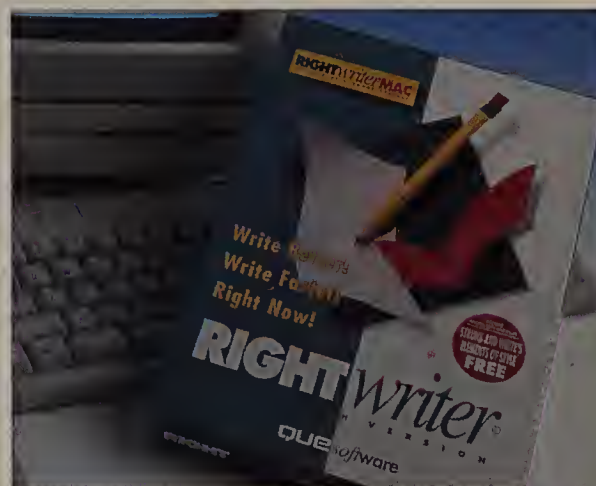


FREE! ONLY FROM TIGER

RightWriter for the Mac

FREE WHEN YOU BUY BEAGLEWORKS!

RightWriter for the Mac. One of the more popular categories in software is the grammar checker, arguably the most important word processing add-in. With



today's business climate, poorly written correspondence is separating success and failure. RightWriter's depth and attention to the details of written communication makes it the premier grammar checker for the Mac. Conclusive testing has established RightWriter as the most accurate, most flexible and easiest to use over any of its competitors.

RightWriter for the Mac is designed to flag errors in your writing from a rule base of over 4,500 — including rules of grammar, style, usage, punctuation, sentence structure, subject-verb agreement and more. RightWriter produces a copy of the document and performs its analysis. Then displays (or prints) your document with flagged errors and explanations. These explanations are your guide to better writing.

RightWriter Contains Over 4,500 Rules, Including:

Grammar Rules

- Noun-Verb Mismatch
- Sentence Fragment
- Run-On Sentence
- Misused Verb
- Misused Pronoun
- Misused Article
- Wrong Verb Form
- Misused Word
- Possessive Use
- Is This Correct?
- Repeated Word
- Capitalization

- Conjunction Start
- Weak Sentence Start
- End With Preposition
- Negative Sentence
- Use Simpler Terms
- Use Simpler Word
- Consider Omitting
- Ambiguous Wording
- Cliche
- Overused Phrases
- Single Word Quote
- Contraction

Usage Rules

- Colloquial & Slang
- Archaic
- Sexist
- Legalese
- Computer Terms
- Vague
- Wordy
- Redundant
- Questionable Word

Style Rules

- Passive Voice
- Split Infinitive
- Long Sentence
- Sentence Length
- Difficult Sentence
- Use Verb Form
- Long Paragraph
- Start With But

BEAGLEWORKS

BBP2700 BeagleWorks	\$184.00
BBP2701 Competitive Upgrade	\$95.00

Upgrade to 1-2-3: Just \$69⁹⁵! After Wire Transfer Rebate From CheckFree

REVIEWER'S NOTEBOOK: *The thoroughbred of Macintosh spreadsheets. Not a step-child of the original DOS product, Lotus 1-2-3 for the Mac has been designed from the ground up to exploit the power and flexibility of the Mac. Revolutionizing financial software with true 3-D worksheet capabilities: Excel doesn't have it, Claris Resolve doesn't have it. Fully featured, with System 7 support; completely customizable with desktop tear-off menus; most functions require just a mouse click. Excel users will be surprised at the power and grace engineered into Lotus 1-2-3 for the Mac.*

Lotus' deep understanding of advanced spreadsheet and financial modeling technology is present here. True 3-D worksheet management, incredibly nimble relational database power and easy-to-use formulas. Over 14 million people rely on the Lotus concept to create budgets, perform precise forecasting and instant analysis. Proposals and presentations ring with clarity with Lotus' financial graphs and tables. It's easy to edit cells, create graphs, and import data, using the same menus, tools and file formats across worksheets, graphs and macros.

Using 1-2-3 for the Mac is fast and simple. It embraces new System 7 and provides the classic 1-2-3 menu for complete keystroke compatibility. We love the use of floating toolboxes and palettes, allowing customization of your workspace. Moving around is silky and streamlined, allowing you to quickly select ranges (before or after starting commands). You get in-cell editing and the ability to directly manipulate chart elements. You also get 256 colors, 49 different fill patterns and 230 line styles and thicknesses for use in your spreadsheets.



Along with the brutal power of 3-D worksheets, you can easily customize database forms for automatic fill-in and printing, perform a host of advanced relational capabilities, including swift queries (a particularly useful feature), an ever-

active macro recorder (an incredible time saver!), and automatic compression routines for any printer. By the way, Lotus throws in a free copy of Adobe Type Manager.

With 1-2-3 for the Mac, complicated tasks, like consolidations, don't require tedious linking or endless dialog box activity, just a couple of mouse clicks is all it takes. Easily bring remote data right into 1-2-3 through DataLens and the Apple Data Access Language. Read FoxBase and dBASE files directly.

Lotus 1-2-3 for the Mac towers over the capabilities of Excel in a host of areas. Its ability to perform true 3-D functions is an enormous advantage. And the spectacular range of colors and graphic devices available within the worksheet. Excel doesn't allow you to directly manipulate elements in charts, or perform in-cell editing Lotus 1-2-3 for the Mac does. Excel doesn't include relational capabilities, floating toolboxes or palettes, you can't customize your workspace or have your macro recorder on all the time. 1-2-3 does.

When it comes to spreadsheet features, no one even comes close to 1-2-3 for the Mac. That's because only Lotus has engineered true 3-D worksheet power into 1-2-3. Excel users are converting in droves to the newest, hottest spreadsheet product,

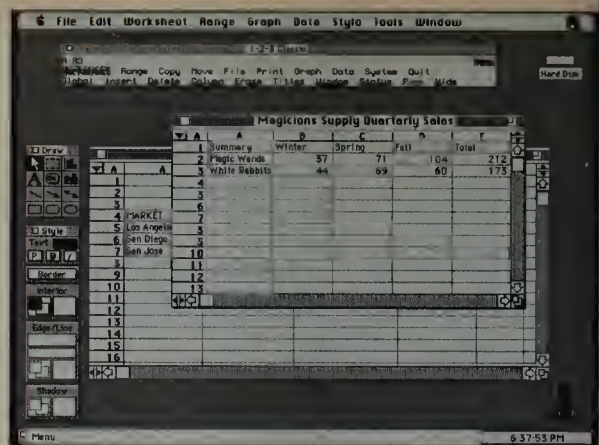
finding features like relational joins and queries, the 1-2-3 Classic menu for 100% keystroke compatibility, vast color and graphics support and a dozen other advantages. In fact, we've compiled a feature-by-feature comparison for your review. But there's an intangible difference: The proven 1-2-3 approach to the worksheet. Just the feel of the in-cell editor, pop-up functions and macros display the refined Lotus functionality. John Sculley, CEO of Apple says "...This is a spectacular product." And MacWeek raves: "The most impressive aspect of the program is its implementation of the Macintosh interface. Mac aficionados will have no problems with the program — 1-2-3 Mac is a Mac application to the core." The numbers have never looked so good...

More Powerful Than A Locomotive. True 3-D worksheet management lets you tackle complex tasks, without complicated linking or dialog boxes. Bring remote data right into Lotus 1-2-3 through DataLens® and the Apple Data Access Language. Then work with it using full relational database power and custom database forms. No matter what you're doing, you'll see only one set of menus, tools and file formats. You'll get so much done with so little to learn.

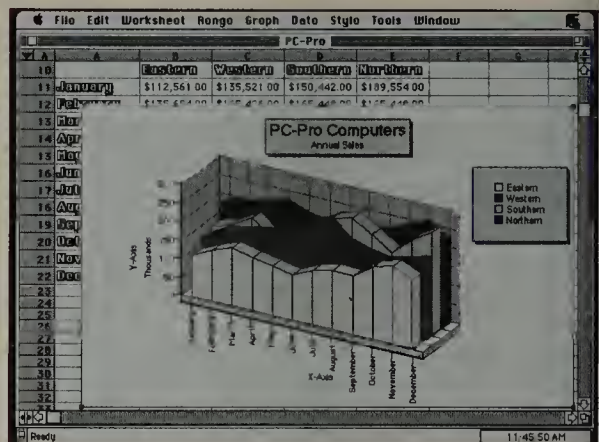
No Mac Is An Island. Share files, macros and applications with Excel users? With PC users? Yes. You heard right. 1-2-3 for Macintosh directly reads and writes Microsoft® Excel for Macintosh files. So you can make the switch to 1-2-3 and never look back. What's more, 1-2-3 for Macintosh is fully compatible with all 1-2-3 files and macros, including PC versions. More than fourteen million people already rely on Lotus 1-2-3 for accounting, budgeting, forecasting, analysis, proposals, presentations and much more. Now Mac lovers can, too.

See How The Newest Macintosh Spreadsheet Stacks Up.

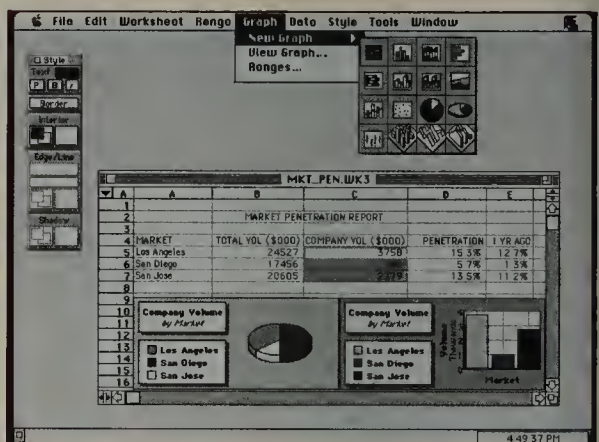
Features	Lotus 1-2-3 for Macintosh	Microsoft Excel 3.0
Optimized for Macintosh		
• Supports system 7 features	Yes	Yes
• Floating toolboxes and palettes for custom workspace	Yes	No
• Directly manipulate chart elements	Yes	No
• In-cell editing	Yes	No
• Context-sensitive, graphical help	Yes	No
• Select ranges before or after starting commands	Yes	No
• Supported colors/fill patterns/line styles and thicknesses	256/49/230	16/18/32
Powerful Spreadsheet Features		
• True 3-D worksheets	Yes	No
• Pop-up functions and range names	Yes	No
• Menu promotion	Yes	No
• Same menus, tools, and file formats across worksheets, graphs, and macros	Yes	No
• Adobe Type Manager included	Yes	No
• Automatic compression on all printers	Yes	No
• Macro recorder always active	Yes	No
• Customizable database forms	Yes	No
• Relational joins and queries	Yes	No
• Directly reads FoxBase and dBASE files (.DBF)	Yes	No
Compatibility		
• Reads and writes all 1-2-3 files	Yes	Yes
• Runs all 1-2-3 macros without translation	Yes	No
• Reads and writes Excel files	Yes	Yes
• 1-2-3 Classic Menu provides keystroke compatibility	Yes	No



"Classic" 1-2-3 menus work the same as the 1-2-3 everyone knows and loves. (Or use the standard Mac menus — your choice.)



Only 1-2-3 has true 3D-Worksheets. Perfect for linking Profit Centers and multiple departments.



Fantastic charting including 2-D and 3-D charts in numerous styles and types — all available with the click of the mouse. And only 1-2-3 has floating toolboxes for ease-of-use.

FREE!

ONLY FROM
TIGER

CheckFree

When You Buy Lotus 1-2-3 for Macintosh
Now you can pay your bills electronically — via modem — regardless of which bank you use, or who's on your payment list. CheckFree uses its built-in telecommunications program to handle payments through the Federal Reserve System for 100% safety and reliability. And with CheckFree, you'll pay all of your bills in about ten minutes! That's it. No checks! CheckFree keeps an electronic check register for you and works seamlessly with financial management software like Quicken and Managing Your Money. **A \$29.95 value. Yours Free!**

ORDER YOUR COMPETITIVE UPGRADE TODAY!

If you are a current 1-2-3 user, you are automatically eligible. If you use Excel, Claris Resolve or another competitive spreadsheet, you too are eligible.

ALSO FREE WITH 1-2-3 — DYNOPAGE

LOTUS 1-2-3 MAC	
BBP2485 Lotus 1-2-3 Mac	\$325.00
BBP2486 Lotus 1-2-3 Mac Upgrade	\$99.95

ADD SIX SERIAL PORTS — INSTANTLY!

Connect And Control Modems, Printers, Networks, Peripherals And Other Serial Devices. Hardware And Software Included.

REVIEWER'S NOTEBOOK: *One of the most useful new ideas in computing — Enables you to control — from a software interface — up to six serial devices. (Macs only come with 2 — Printer and Modem.) It's like adding six serial ports to your Mac (in fact, we found that it's almost like having TWO computers). Configure your equipment any way you like: One Mac to six devices; One Mac to five networks or four Macs to two devices. A snap to install, simple to operate and fully System 7 compatible. Full two-year warranty on everything.*

So forget changing cables, swimming through wires and fiddling with A-B switches (those things can actually cause system freeze-up!). Now you simply pop up the MultiPort screen, select the port you want to use from a graphical on-screen diagram — and you're done. Choose from six serial ports and five ADB ports — a total of eleven! The LED lights on the MultiPort unit indicate the port selected and your INIT installs setups for specific situations, each time the Mac is started. There are dozens of possibilities for the MultiPort, like using it "inside out" to allow up to 4 Macs to share two non-LocalTalk devices. You can even have more than one mouse connected to your Mac; your standard Mac mouse for normal use, and a trackball-type mouse for graphics and publishing work.

Performs beautifully with all Mac add-on equipment — we tested every Mac serial device we could find and saw 100% compatibility!

A must for the Mac user performing multiple tasks and working with assorted equipment. Everything you need to get going is included: controller box, detailed user's guide and accompanying software. Runs off of ADB power, no power supply is needed to operate the MP-91.

Software-Controlled Ports.

This compact little device — about the size of a paperback book — is the answer to connecting extra serial ports and controlling them on your Mac screen. Simple controls allow you to just click to select a port — or to invert the Port in-out lines, or port character-printer or modem. The MultiPort MP-91 is the ideal Desk Accessory that's guaranteed to save you hours of time switching cables, running and re-running wires. It's the easiest system available for multiple port switching.

Here Are The Installation Instructions:

The MultiPort MP-91 simply plugs into the printer, modem and ADB sockets on the back of your Mac. Your add-on equipment (printers, modems, scanners, etc.) are plugged into the MP-91. A software Desk Accessory goes into the System. That's it.

That Was Fast...

And using the MP-91 is even faster! All the selections you make are handled by the software, so there's really no need to touch the MP-91 again. Just tuck it away and enjoy its ingenious functionality. Our "Printer Sharing Test" saw connections of: Four Macs to one ImageWriter; Two Macs to two LaserWriters and two ImageWriters — and a modem; even One Mac connected to two LaserWriters, 1 ImageWriter on LocalTalk, a modem and a scanner. We connected, re-connected and re-routed as many different serial devices we could find — with easy con-



MultiPorts

Four serial ports located on the back of the enclosure can be characterized as either "Printer" or "Modem". Connect up to six non-LocalTalk printers!

System Ports

Two more serial parts on the back are software defaults as startup and cannot be re-characterized. Always either "Printer" or "Modem".

ADB Ports

Four additional ADB ports and the connection for an optional ADB power supply are conveniently located on the side of the MP-91 enclosure.

nections and reliable performance — every time.

What's The MP-91 Secret?

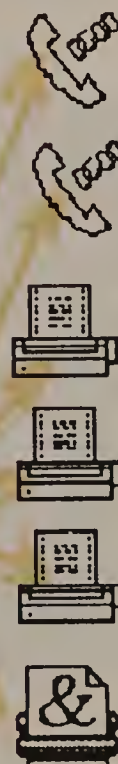
The magic of Apple's ADB (Apple Desktop Bus). The MP-91 and its proprietary software combine to create a lightning fast data highway, similar to Ethernet, between the serial device — and your Mac.

Printer Drivers & The Chooser

All Mac printers are controlled by software programs called "drivers". These driver programs are represented by icons that appear in the selection panel of the Chooser. You select these drivers by clicking on them in the Chooser. MP-91 Control allows you to switch to an MP-91 serial port which may have **any** type of printer attached. BUT — you must first select the appropriate printer driver with the Chooser before initiating printing in your application if the printer type is different than the one already selected in the Chooser.

You have a LaserWriter attached to the "Printer" port and an ImageWriter attached to MultiPort #2. You have been using the LaserWriter, and now want to use

It's the smoothest way to connect your Mac to half a dozen printers, modems, networks, or any other serial device. Fully automatic and software controlled. Or turn it around and share expensive devices (like a high-speed modem) with multiple Macs!



MP-91 Control to select MultiPort #2 to use the ImageWriter.

Other Drivers

Modems use drivers, too. These, however, are usually part of the communication program (Such as MicroPhone II™ or AppleLink™). Therefore no driver selection is necessary using modems, just click to the port you want.

MP-91/2:6 Features

- Six Serial Ports — Software Controlled
- Five Full-Time ADB™ Ports
- Easy Port Selection With Software
- LEDs Indicate Port Selections
- ADB™ Interface — No power Supply Needed
- All Connections Easily At Hand
- Compatible With All Macintosh Serial Printers And The Chooser™
- Same Convenient Size As 3.5" Floppy
- Compatible With All BusRider™ Products Such As The BC-91™ Bar Code Reader



MULTIPORT

BBP2785 Multiport MP-91 \$227.00
Dimensions: 120 W x 172 L x 38 H mm, 4.75 W x 6.8 L x 1.5 H in.
Warranty: Two Years On Everything.

The Industry's Only Continuous Hard Disk Backup.

REVIEWER'S NOTEBOOK: Ordinary backup systems make periodic backups of your data to a tape or floppy, and that's fine; but DiskTwin offers you automatic, continuous backup protection (great for workgroup servers, transparent while AppleShare runs). That means up-to-the-instant data backups (from primary disk to secondary disk) without any effort at all. Just install DiskTwin and never worry about it again. Another important advantage: DiskTwin features Automatic Cutover, which keeps your Mac on-line during a system crash, seamlessly switching you to the second drive. DiskTwin has the ability to rebuild bad blocks at up to 85mb/per minute. And with DiskTwin's parallel SCSI buses, you don't suffer any performance loss! DiskTwin includes PartitionTwin, a unique utility that allows you to use selected portions of your hard disk. DiskTwin was awarded an honorable mention as storage product of the year in the MacUser Eddy awards. It also received four-and-a-half stars in their November issue.



You can avoid the most horrifying scenes with an ounce of prevention. It's called DiskTwin, and it could save your life in the event of ... well, the unspeakable. Available either as a NuBus card or SE/30 version (and accompanying software), DiskTwin gives you a constantly updated backup, so there's no data loss between backups. It is automatic and completely transparent, so you'll never forget to use it. It is also AppleShare® compatible so it doesn't slow down your AppleShare users, and it preserves access privileges. And since DiskTwin uses any standard Macintosh SCSI drive, there's no reformatting or need to update drivers. In short, DiskTwin is a simple, powerful backup system for the Mac.

The automatic cutover feature actually keeps your computer running — right through a disk failure — without any loss of data! DiskTwin simply moves you to the twin disk, you (and your workgroup) continue to work without interruption. The failed disk can be repaired or replaced at any time. The speedy restore function takes control of the recovery process in the event of a primary disk failure, rebuilding data with lightning speed. Once it restores the data and your disk is operational, DiskTwin re-

turns to its continuous backup duties. All DiskTwin error messages can sent via e-mail.

On servers, DiskTwin is the great protector, keeping them on-line through even the most serious interruptions. DiskTwin's mail notification is ideal for unattended or "headless" servers. And DiskTwin doesn't require server shutdown to archive continuously or for archival backup. It's compatible with all file sharing, e-mail, database and other workgroup software.

DiskTwin Scenario — AppleShare / E-Mail Server. Acme Widgets uses an SE/30 AppleShare server with an 80mb internal hard disk for a customer database and QuickMail. How can Acme's network administrator protect her company from losing all of its customer records when a disk crashes and eliminate downtime from a busy workday?

The DiskTwin Solution. Using DiskTwin with a removable cartridge drive, the administrator can keep both an archive of the entire 80mb server disk and an up-to-instant backup. Every evening, she removes the twin cartridge for safekeeping and replaces it with another. By exchanging cartridges daily, the administrator has both continuous server backup and an archive that's immediately usable, unlike a tape or floppy backup.

If Acme's server disk crashes, DiskTwin automatically cuts over and continues operation from the cartridge disk, preventing downtime and the loss of the day's work. Users continue working uninterrupted, unaffected by the disk crash. DiskTwin's QuickMail Notification sends an e-mail to the administrator and other designated users, warning them that a disk has failed. The crashed disk can be repaired or replaced at a convenient time.

Scenario #2 — Individual User. An illustrator uses a Macintosh IIfx with a 330MB disk plus a 40 MB external to create large images for a daily newspaper. At any one time, he has about 40MB of current projects on his disk. From time to time he does a copy of key files from the 330MB disk to the 40MB disk. It takes a long time and he has to constantly remember to do it. The illustrator has learned to live with tight schedules, but his Mac has not. How can he ensure that he never misses a deadline?

The PartitionTwin Solution. Simply by adding the DiskTwin system to his existing configuration, the illustrator can keep a continuous backup of his current work. He can twin a 40MB partition from the larger disk to the 40MB disk, using PartitionTwin. He keeps all his current projects in the partition on the big disk and as he works on them, DiskTwin automatically maintains a complete backup. If his larger disk ever fails, he has a ready-to-use backup.

DiskTwin gives you:

- Continuous, Up-To-The-Instant Backup
- No Data Loss With Hard Disk Failures
- Background Operation/Totally Transparent
- Fully AppleShare Compatible
- Uses Any Standard Mac SCSI Disk Drive
- No Performance Loss or Slow Down
- Fits Any Mac II, SE/30 or Quadra

"A godsend for network managers concerned about downtime."

MacWorld Magazine



TwiniIt — Backups On A Budget. TwiniIt is the software only version of its illustrious bigger brother, DiskTwin. It provides the same fully automatic, continuous-backup abilities for individual users and compact servers. Since no hardware is required, it runs beautifully on all Mac versions. It also works with all SCSI disks, with no reformatting or disk driver replacement necessary. TwiniIt also allows you to create archives, using removable cartridges or erasable optical disks. These archives are ready-to-use.

DiskMaker: New From The Makers Of DiskTwin. If you own a SCSI disk, why settle for the lightweight software that the manufacturer usually provides? DiskMaker is the universal SCSI disk formatter that works with any SCSI disk and eliminates disk software incompatibility. So if you have different types of disks, you won't have to scramble to learn the different software. And DiskMaker lets you do more — much more. It features full System 7 support, with 32-bit addressing and virtual memory support.



GOLDEN TRIANGLE

7

BBP2430 DiskTwin	\$599.00
BBP2431 TwiniIt	\$89.00
BBP2432 DiskMaker	\$55.00

DiskTwin: Macintosh SE/30 or II series but Apple NuBus or PDS adapters required for IIs; System 6.0.4 or later; SCSI twin disk; no minimum memory requirement. **TwiniIt and DiskMaker:** Macintosh Portable, Plus, SE series, or II series; System 6.0.4 or later; SCSI twin disk 1 TwiniIt only; no minimum memory requirement.

Bone-crushing Radius Rocket Speed!

Scientifically Engineered Performance For The Desktop Studio.

REVIEWER'S NOTEBOOK: Radius has always been on the lips of art directors, designers and studio producers who use Macs. For years, the creative community has turned to Radius to speed their work and enhance their creativity. As an authorized Radius dealer, Tiger presents The Rockets: advanced Motorola 68040 processing power at a new lower price.

The revolutionary Radius Color Pivot Display is the only monitor that works the way you do — in both portrait and landscape modes. See a full page without scrolling. A spectacular value!

One other note: For PowerBook users who want a clean, crisp connection to external color displays, the Radius PowerView is the perfect instrument. Lightweight, small and built to survive an airport cargo crew, the PowerView displays up to 256 colors and easily plugs into your SCSI port.

Tiger is fully stocked with these magnificent new Radius products and ready to ship; but you must act fast, these are the most popular boards in the business right now.

ACCELERATORS: The Rocket 25i provides lightning quick speed for Mac page layout and publishing applications. The Rocket 25 straps on 25MHz processing capabilities and includes floating point instructions. Then there's the Rocket 33 — featuring the fiery rage of Motorola's 33MHz 68040 processor. The Rocket 33 clocks in at over 32% faster than the 25MHz "040" (COMPARE VALUE! The Rocket 33 is 30% faster than the Quadra 700 upgrade and is hundreds of dollars less!) The Rocket 33 is the right board for 3-D modeling, like Pixar's MacRenderman, popular animation applications, publishing and image

processing programs and more.

THE RADIUS ROCKET 25i

This is hot new Motorola '040 speed technology at an unbelievably low price. Built to dramatically speed up QuarkXPress, Adobe Illustrator and Microsoft Word. Growling 25MHz '040 processing performance for the Mac II, IIx, IIcx and IIfx. At just \$1,395, the Rocket 25i is less than HALF THE PRICE of the Quadra 700 Upgrade (Apple charges you \$3,495 for it — ouch!). One of the industry's hottest boards at a great price. Full support of System 7, NuBus slot design for effortless installation. Great for speeding up RIPs! We were impressed with the software that is included with the Rockets. It allows your system to selectively enable or disable the '040 cache mode — actually making the Rocket more compatible with existing Macintosh software than the Quadras themselves!

Let's have some fun. We combined a Radius Rocket 25i with an 8x (and subsequently a 24x) and tore apart the SuperMac Thunder/24 — which, until then, we thought was a hot board.

Call one of our Mac specialists and ask about the specific capabilities of the Rocket 25i, the Rocket 25 and the amazing Rocket 33 — get the right power (and appropriate RAM SIMMS) for your needs.

Color Portrait And Landscape Display In One!

The immortal Radius Color Pivot. The only monitor in the world that can display a full page in color and pivot to display a full page landscape too! Ask a pro how much easier that makes his life. Now your Mac can have this freedom, along with resolution up to 640 x 870. And the Color Pivot can provide full 16

color support (4-bit color) from onboard video in the IIfx or IIfx — so you don't need an interface card.

The Color Pivot is perfect for design professionals and advanced desktop publishers, but it's also an ideal upgrade for everyday use, especially if you're "in and out" of a variety of applications. Just pivot to see as much of the screen as you need. And it is an excellent value. Consider this — the only other way to see a full page in actual size without scrolling would be to buy a 19" or larger display — many hundreds of dollars more than the Color Pivot!

NEW! PowerView Links PowerBooks To Large Color Displays!

A must for PowerBook users on the run. PowerView is an external color display interface for 140 and 170 'Books. You install it — you don't have to send your PowerBook away. Just plug it into the PowerBook's SCSI and you're ready to go. Run the PowerBook's LCD as a second screen, or in presentation mode to see what your audience is seeing.



radius

RADIUS

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BBP2780 Rocket 25i (25 MHz no floating point)	\$1395.00
BBP2781 Rocket Accelerator (25 MHz & floating point)	\$1859.00
BBP2782 Rocket 33 MHz	\$2299.00
BBP2783 Powerview Interface	\$535.00
BBP2784 ColorPivot	\$1425.00

(Please call for details on the interface for your ColorPivot)

The Perfect Presentation.

To express yourself — and truly communicate — MORE gives you the ultimate set of creative tools for organizing and presenting your ideas. From initial concept to creation of 35mm slides and audience handouts, your presentation takes shape quickly, flowing along with your ideas. Create reports and outlines or detailed tree charts from your presentation notes. When you want to communicate — really communicate — with style and impact, MORE is the only presentation program you'll ever need...

Everything begins with the sleek Outliner. Just enter your thoughts, numbers and proposals, pick a background

— and you've got a presentation, or bullet charts — or tree charts. The Outliner is MORE's secret to quick organization.

Enter data — then automatically create dynamic slide presentations, detailed bullet charts, flexible tree charts and more. Adapt all or just parts of your outline into your presentation. The Outliner allows you to quickly crystallize your thoughts for maximum impact on your audience.

The spoken word becomes electrically charged when synchronized with meaningful slides or overheads. Because MORE is designed to organize your thoughts, your communication is crisper, more direct and more understandable. It's one of the great by-products of preparing your presentations with MORE. What ideas do you have? Funding for expansion. Marketing savvy. Reasons why a prospective client should sign on the dotted line.



SYMANTEC

BBPY7013 MORE 3.1	\$265.00
BBP2705 SUM	\$96.00
BBP2706 SAM	\$66.00

ORGANIZE TIME!

REVIEWER'S NOTEBOOK: First Things First is an award-winning time management utility that has no learning curve — it's immediately useful right out of the box. It puts up a unique Floating Clock-Icon, which stays "on top" regardless of how crazy your desktop gets. It not only always tells you the time and date, but also provides instant access to ToDo lists, to check your schedule, or to set up a Reminder. Just double-click on it, or use the program's built-in hot key, and you are managing your time without wasting any of it.

Perfect timing. It's either the result of incredible luck or determined effort. In business, however, you can't always depend on luck. That's where First Things First comes in. The premise is that even the most organized people have trouble keeping track of all the things they must (and want to) accomplish.

Sound familiar? Time-dependent tasks, appointments and deadlines simply don't care if you have enough time to organize them. And unless a time manager is fast and easy, it is of little use. First Things First is extremely easy to use, delivering instant access to your list of tasks and details. It allows you to organize your efforts by category or project, and keeps you in touch with the big picture even in the wake of interruptions, crises and priority shifts.

You'll quickly create categories, establish reminders and things to do, view and print your lists and have almost unlimited capabilities to customize First Things First to fit your personal style. That's important.

The Floating Deskclock is an access device unique to First Things First. In its 3-dimensional form, it actually decorates your screen. Or, if you like, you can park it in a reduced form in the menu bar. Either way, you just double-click on it any time you want to access your time management program. Nothing could make more sense from a user's point of view!

Printing is a snap. And First Things First gives you complete control of your output, with a variety of styles and fonts. Print just the items within a time range — or your entire weekly schedule. Creating Reminders is simple — just click on "New Reminder" and enter the text for your Reminder. You then choose a Category for your Reminder and set the time and date.



VISIONARY SOFTWARE

BBP2403 First Things First 2.0	\$49.00
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Any Macintosh with at least 1mb of RAM and System 6.0.4 or later.



If only you could design your own typesetter...



LaserMaster's patented TurboRes® technology gives you 1000-dpi, camera-ready copy on plain paper.

TurboGray™ improves the appearance of halftone images by providing increased gray levels at higher screen frequencies.

An expansion port allows for optional Ethernet add-on solutions.

SmartSense™ technology automatically switches to PostScript or PCL for each print job.

You can easily upgrade the Unity 1000 or add fonts by simply copying software files from a floppy disk to the printer.

The standard 9 MB of memory can be expanded to 48 MB using industry-standard SIMMs.

135 Type 1 typefaces are pre-installed on an internal hard disk. There's also room for more than 200 additional typefaces, so downloading fonts is unnecessary.

With a high-speed, 40-MHz processor, 32K of fast SRAM cache, and special DMA circuitry, the Unity 1000 processes even complex documents faster than most PostScript devices.

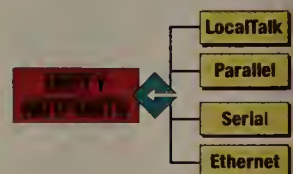
You'd make it fast. You'd have it print camera-ready copy on plain paper. You'd design it to store so many typefaces that you'd never waste time downloading another font. You'd make it easy to expand and upgrade, so it wouldn't become obsolete. And you'd make it capable of printing from just about any computer out there, just in case you ever need to print camera-ready copy from another computer. While you're at it, you'd probably throw in a hundred free typefaces.

Sounds just like our new Unity 1000 Plain-Paper Typesetter. It's fast. It prints at 1000 dpi. It's expandable and software upgradable. It handles fonts like no other printer can. And, it comes with 135 Type 1 typefaces—that's 100 more than other PostScript devices.

Combine these great features with multi-platform capabilities, and you have the kind of typesetter you've been waiting for. Unity provides simultaneous connectivity to virtually all operating environments, so if your office happens to use PCs as well as Macs, you're in luck.

Unity's HotPorts feature

automatically selects the LocalTalk, parallel, serial, or optional EtherTalk interface, and SmartSense automatically switches to PostScript or PCL.



Give us a call to find out more about the Unity 1000. We bet it's the typesetter you've been waiting for.

1-800-950-6868

Dept. 09U

1-612-944-9330, Fax: 1-612-944-0522

LM LASERMASTER™
TYPESETTING DIVISION

Mac, Unix, PC TurboRes Typesetting—FAST!

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Circle 182 on reader service card

MACWORLD

NEWS

THIS MONTH:

Apple's Color Matching
• QuickMail Adds DOS
Format • GCC's First
Color Printer • Personal
Information Managers

BY DAN LITTMAN AND TOM MORAN

Strata's New Skin

Stratavision 3d version 2.5 has a new feature called skin modeling that works by wrapping a surface around ribs. For example, you create a model as a series of two-dimensional cross-sectional ribs that define an object's contours; Stratavision then interpolates the surface between ribs. Skin modeling works with another new feature called Flex Objects, a way of changing the shape of each rib over time to produce moving or metamorphosing objects. Version 2.5 can also convert TrueType and PostScript Type 1 text into Bézier curves, which can be extruded



DICK MAXWELL

STRATAVISION'S SKIN MODELER CAN WRAP A SURFACE OVER MANY DIFFERENT-SHAPED RIBS.

into 3-D space, modified, and rendered. Version 2.5 lists for \$995. Strata has also announced a network rendering package, but price and ship date were not set at press time. Strata, 801/628-5218.—D.L.

2700-DPI Slide Scanner

The Mira 35 from Santos Technology is a low-cost color slide scanner that offers 2700-dpi resolution and a robust Mac interface. The one-pass scanner permits preview scanning at a variety of resolutions and croppings, and it accepts any positive or negative film or slide. For a greater dynamic color range the Mira 35 captures 30 bits of color information, which is processed to 24 bits for display and manipulation on the Mac.

The slide scanner takes about three minutes to scan an entire slide in full color. The



ROBERT PERRY

SANTOS TECHNOLOGY'S MIRA 35 SLIDE SCANNER CAPTURES COLOR IMAGES AT UP TO 2700 DPI.

Mira 35 was slated to begin shipping in April. Its suggested list price is \$2695. Santos Technology, 213/320-8888.—T.M.



JENNIFER SAUER

HUMANS WANDER THROUGH A COMPUTER-GENERATED WORLD IN GEORGE COATES'S *INVISIBLE SITE*.

The Invisible Site

Silicon Valley companies, including Apple, can't seem to line up fast enough to support San Francisco multimedia performance artist George Coates. Coates has convinced them that productions like his *Invisible Site: A Virtual Sho* can create a more-than-virtual market for their products. *Invisible Site* features animated characters alongside real ones in what the audience, wearing 3-D glasses, is meant to see as a fully sensory online world. Its hero and heroine arrange to meet on Prospero's cyberspace island, but a Rimbaud-obsessed hacker keeps them apart during detours through visually exotic locales. Performance Works, 415/863-4130.—ANN GARRISON

TREND

Supra Fax Modems Break Price Barrier

Supra Corporation has introduced two fax modems that promise high performance at low price points. The two devices are among a number of fax modems that offer faster data transmission than was previously widely used. The SupraFaxModem V.32bis sends and receives faxes and data at 14,400 bps and lists for \$399.95. The SupraFaxModem V.32 sends and receives faxes and data at 9600 bps and lists for \$299.95.

Both fax modems are compatible with the Group III and earlier fax-transmission protocols, and as modems, both support the V.42bis, MNP Classes 2 through 5, and MNP Class 10 data-compression and error-correction standards. V.32bis can further increase data transmission speeds by a factor of four when communicating with another V.32bis-compatible modem. Both devices are available now. Supra, 503/967-2400.—T.M.



JOHN WILLIAM LUND

THE U.S. ROBOTICS SUPRAFAXMODEM V.32BIS SENDS FAXES AND DATA AT UP TO 14,400 BPS.

ILLUSTRATORS, THE PRESSURE IS ON.

Using Aldus FreeHand and the pressure-sensitive Wacom stylus, you can create natural-looking pen and brush strokes, like the ones on the lead horse.



With the winning team of Aldus FreeHand® 3.1 for the Macintosh and Wacom's pressure-sensitive tablet, your illustrations will pull ahead of the pack. Aldus FreeHand, linked to the Wacom stylus, works and feels just like a pen or brush. Now you can easily create those graceful thick and thin strokes that you used to have to make tediously, click by click.

Aldus FreeHand is a productivity tool, too. It's also available for Windows 3.0, so you can freely exchange designs with PC users. You can take full advantage of Apple's System 7 features. And a new hotlink from Aldus PageMaker® lets you work on Aldus FreeHand graphics from within the page layout.

Aldus FreeHand is one of a suite of graphic-arts products we've designed to work together as intuitively—and creatively—as you do. For a free self-running demo or working model, call 1-800-685-3563.



GCC's First Color Printer

GCC Technologies has announced its first color printer, a dye-sublimation device called the ColorTone. The company has also introduced a wide-carriage QuickDraw printer called the WideWriter 360.

The 300-dpi ColorTone printer will approach photo-realistic quality, according to GCC, and will come with 10MB of RAM and an internal 100MB hard drive that supports font caching, virtual memory, and easier updates to the printer's software. It includes Phoenix-Page, a PostScript Level 1-compatible page-description language. The ColorTone has connectors for EtherTalk, AppleTalk, and serial and parallel ports, and all the ports can be connected simultaneously. The price and availability for the ColorTone were not set at press time, but the price was expected to be under \$10,000 and shipping was tentatively scheduled for the second quarter.

The WideWriter 360 is a QuickDraw-based printer built around a 360-dpi Canon ink-jet engine that can also produce 180 dpi in draft mode. The single-color printer is intended for CAD, spreadsheets, and other applications that require wider paper. It comes standard with one sheet feeder; a second sheet feeder will cost about \$149, although the price was not set at press time. The WideWriter includes an AppleTalk connector and an RS-422 serial port and will list for \$1599. GCC hoped to begin shipping the WideWriter 360 on April 15. GCC, 617/890-0880.—T.M.



OUTPUT FROM THE GCC COLORTONE DYE-SUBLIMATION PRINTER APPROACHES PHOTO-REALISTIC QUALITY.

TREND

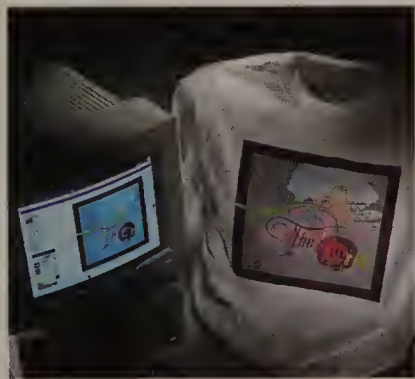
QuickMail and MHS

CE Software has announced plans for a version of QuickMail with support for Novell's MHS (Message Handling Service). MHS is the dominant environment for messaging in the DOS world. MHS is a rich platform for building E-mail, groupware, and other messaging-based applications, providing such features as message encryption, sender and contents authentication, and message routing. About 120 commercial DOS and Windows applications support MHS. QuickMail for MHS will be able to communicate with all of them, and is likely to build momentum for other Mac-based MHS products. Pricing was not set at press time. CE Software, 515/224-1995.—D.L.

Mail Stop

Lotus Development's cc:Mail is being revised to version 2.0, and another leading E-Mail package for DOS and Windows PCs called Da Vinci eMail is making its first foray into the Macintosh market.

By supporting multiple data types (graphics and sound, and



AFTER RUNNING PARO PAPER THROUGH A COLOR COPIER, YOU CAN TRANSFER THE COLOR IMAGE TO A T-SHIRT.

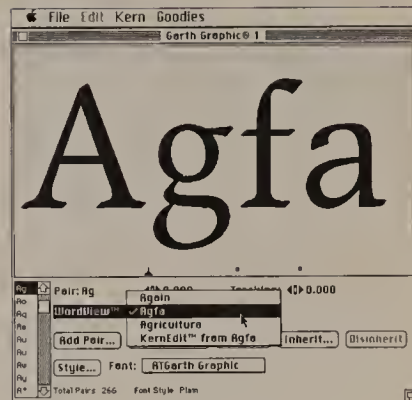
Mac to Fabric

Silk-screened T-shirts may soon go the way of vinyl recordings and rotary-dial telephones. Graffoto has come out with Paro, special paper for transferring images—even four-color, photo-realistic scans—from the Mac to fabrics. Users send images to a Canon Color Laser Copier equipped with a special Canon controller or an EFI Fiery CLC Controller, which in effect turns a color copier into a computer printer. The image is printed on Paro paper and then heat-pressed onto fabric, eliminating the cost of a silk-screening setup for tests and short runs. Graffoto is working on a similar transfer for the Xerox 5775 Digital Color Copier. Graffoto, 604/683-1232.—ANN GARRISON

color text-highlighting, for example) in one message, and enabling users to view attachments, play sounds, and run QuickTime movies from inside the message, cc:Mail 2.0 moves a little closer to the company's goal of a compound document architecture. Lotus Development's cc:Mail division, 415/961-8800.

Da Vinci is marketing MacAccess, developed by Action Technology, and working on a full-featured Macintosh version of Da Vinci eMail. MacAccess supports MHS (see "QuickMail and MHS" above), provides conversation threading, and can save a half-written message to be completed later. Da Vinci also plans to develop add-ons like its Assistant for Windows, which performs filing and mail forwarding, can send a stock reply to all incoming messages (for example, "Out of town until Friday"), and issues reminders. Prices for all products depend on number of users. Da Vinci, 919/881-4320.—D.L.

News



KERNEDIT SHOWS THE PAIR BEING KERNED IN THE CONTEXT OF WHOLE WORDS THAT USE THE PAIR.

Agfa's Type Tools

Miles Agfa Division is marketing two utilities for people who are serious about typography. KernEdit allows the user to create or edit kerning-pair tables for PostScript Type 1 and TrueType fonts. It maintains a list of words to display as examples while altering the kerning of a letter pair. KernEdit lists for \$149. Agfa is also selling KernData, \$99 collections of predefined kerning tables for a wide selection of fonts. TypeChart is a \$99 collection of type specimens for printing out as a type book. It includes a utility for resolving font ID conflicts, and it supports changing the text-block specimen. Agfa, 508/658-5600.—D.L.



TURKEY SHOOT

DESIGN FLAWS NOTED

Macintosh LC and LC II Standards? *We* don't need no stinkin' standards! Who cares if your multisync monitor doesn't work with your LC? After all, *we* don't sell multisync monitors. (Fortunately, some monitor vendors sell an LC adapter; others build it in.)

Spelling Checkers and Ligatures Why is it that spelling checkers and related tools for virtually every product that has them—even desktop publishing software—can't interpret ligatures correctly? Maybe someone thinks Mac users don't care about typography?

Macworld will send you a Turkey Shoot T-shirt if we shoot your turkey in this column. See *How to Contact Macworld*.



Now, MS-DOS Files Can Look Just Like Mac Files.



AccessPC is System 7 savvy as well as completely compatible with Apple's System 6.

and give the PC folks back their diskette.

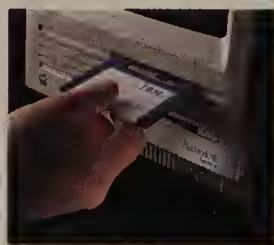
AccessPC is so easy to use, it gives new meaning to the word *utility*.

With AccessPC®, you just pop any DOS floppy in your drive, and in a couple of clicks, what you see on your desktop are Mac files.

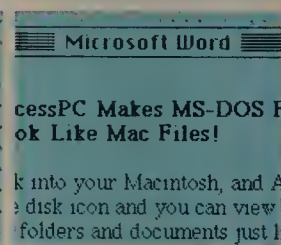
And they not only look just like Mac files, they act just like Mac files in Mac applications.

You can edit, copy, save, print, play with the numbers, print again,

Insignia Solutions™
Bridging Worlds Of Software™



Put MS-DOS disks in your SuperDrive, double-click on the DOS file, and open it in your Macintosh application.



Plus, it includes powerful Multi-Driver™ and Media Formatter™ utilities, *free*. You get instant compatibility even with DOS removable cartridges and optical drives. And you can get access up to ten times faster than with other utilities.

Pick it up today. You'll be amazed at how such an inexpensive little utility can make you look so good.

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Insignia Solutions Ltd., Bellfield House, Bellfield Road, High Wycombe, Buckinghamshire, HP13 5HP, UK. FAX +44 494-459720. Call +44 494-459426.
AccessPC and SoftPC are registered trademarks and Multi-Driver and Media Formatter are trademarks of Insignia Solutions Inc. All other product names are trademarks or registered trademarks of their respective owners.

Circle 235 on reader service card

Apple Standard for Color Matching

To reduce confusion and wasted motion in the field of color output, Apple Computer plans to add a color-matching extension for QuickDraw to its system software by the end of the year. Not yet officially announced, the Apple Color Matching System will be based on the CIE XYZ color space and will have the advantage of working with existing applications, because it will require only new device drivers instead of major rewrites of each application. If, as expected, the Apple method is adopted by vendors of color input and output devices, the vendors will not have to put as many resources into creating and pushing their various color-matching methods. That lowered overhead may ultimately mean that a complete color-matched Mac system will cost less.

The Apple color-matching software will include Color Systems Manager, an exact copy of the QuickTime Component Manager, which will keep track of the gamma curves, RGB values, and color temperature of the different hardware devices attached to a user's system. The Color Systems Manager will allow vendors of other color-matching methods to drop their algorithms into a folder and have

them take precedence over the native Apple algorithms. The Apple algorithms, called Color Matching Utilities, are programs that translate between different color spaces.

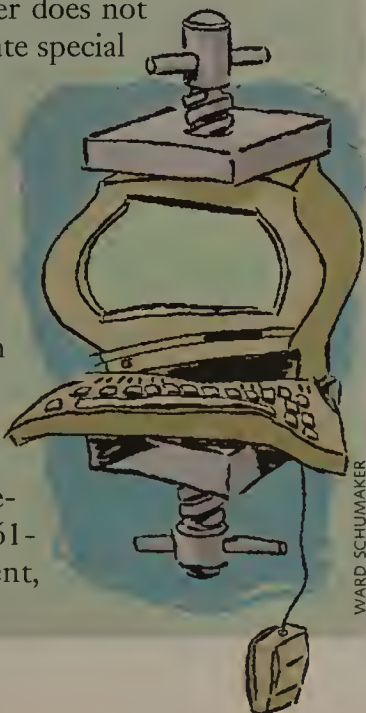
At press time, Apple had not decided if it will charge for the Color Matching System, which will require System 7.—T.M.

TREND

Saving Space

Software that compresses files to make more room available on a hard drive is nothing new. But the new generation of compression products have a key improvement: once installed, they can operate invisibly. The user does not have to create archive files, designate special folders, or modify file names.

Aladdin Systems' StuffIt SpaceSaver (\$59.95), Alysis Software's More Disk Space (\$99.95), and Salient Software's AutoDoubler (\$79.95, and the only product shipping at press time) all do essentially the same thing, though Alysis says More Disk Space can incorporate a decompression engine inside an application that decompresses resources only as they are required. Aladdin Systems, 408/761-6200; Alysis, 415/566-2263; Salient, 415/321-5375.—D.L.



WARD SCHUMAKER

DESKTOP LIBRARIAN

Books on Word 5

This month we crack open four books on Microsoft Word 5.0.

- *Word 5 Companion, Macintosh Edition*, by Gena B. Cobb, Allan McGuffey, Judy Mynhier, with Mark Nieker (1992, \$27.95). This book starts by detailing the new features of Word 5. Sections cover what you need to know before using the program, working inside Word, formatting techniques, word processing utilities, and customizing your Word setup. Microsoft Press, 800/677-7377.

- *Macworld Guide to Microsoft Word 5*, by Macworld contributing editor Jim Heid (1992, \$22.95). The book's four sections cover Word basics, editing and proofing, advanced formatting, and streamlining your work. Each of its 34 topics begins with an overview, moves to step-by-step examples, and finishes with quick tips. Includes a pull-out quick-reference card. IDG Books Worldwide, 415/358-1250.

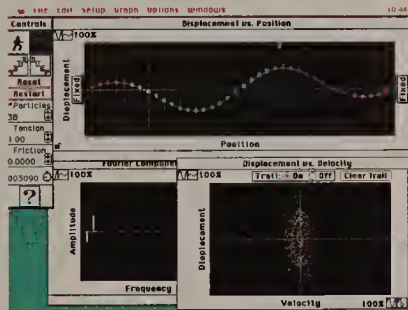
- *Microsoft Word 5 for the Macintosh Made Easy*, by Paul Hoffman (1992, \$19.95). Each chapter begins with a lesson and ends with exercises. The first section is a quick-start introduction; subsequent sections cover basic editing, using Word to format, and other Word features. Osborne McGraw-Hill, 800/227-0900.

- *Getting Started with Microsoft Word for the Apple Macintosh, Version 5*, by Michael Boom (1992, \$19.95). This beginning-level book includes tutorials, examples, and tips on topics ranging from creating a business letter to producing special documents with headers, footers, tables, and other graphics. Microsoft Press, 800/677-7377.—T.M.



SCOTT PETERSON

FOUR OF THE LATEST BOOKS ON MICROSOFT WORD 5.0 TAKE DIFFERENT APPROACHES TO THE SUBJECT.



WAVEMAKER TUTORIAL SOFTWARE SIMULATES VARIOUS WAVEFORMS.

New Wave

During the third semester of college, once they've taken the required math, serious physics students tackle the physics of vibrations. Now less-advanced students can learn the basics with Wavemaker, software that simulates the waves and oscillations of complex linear systems. Wavemaker's innovations include preset and user-definable graphs that show relationships among variables, and an introduction to Fourier analysis.

Pricing and distribution were not set at press time. For information, call Charles Whitney, Harvard-Smithsonian Center for Astrophysics, 617/495-9798.—ANN GARRISON

News



ALEX VIARNES

USING A SPECIAL ATTACHMENT (RIGHT), THE SPECTRA STAR MODEL 450 COLOR PRINTER CAN ALSO MAKE SLIDES.

Color Printer Makes Slides

General Parametrics has introduced the Spectra Star Model 450, a color thermal-wax transfer printer that includes a slide-making attachment. The PostScript device can also produce transparencies. It incorporates a 32MB hard drive that can store the images to be made into slides.

The Model 450 produces 300-dpi output. It is shipping at a list price of \$14,990. General Parametrics is also offering the slide-making attachment as a \$6995 upgrade to its Spectra Star Model 440 and its other printers. General Parametrics, 510/524-3950.—T.M.

Air Time

Ham radio operators have been doing what BBS users do for years: sending messages or setting up radio conferences to talk about religion, sex, politics, car repair, and the latest movies. Now hams are using radio to send digital messages between computers, and the FCC has a license for digital ham operators that doesn't require knowing Morse code. The National Amateur Radio Association (NARA) has just released MacHam, a \$34.95 coaching program for the license test. MacHam contains all 700 possible questions and generates practice exams. NARA, at 206/232-2579.—ANN GARRISON

THE PINN

TYPE: 3.5" OPTICAL
CAPACITY: 128 MB
SIZE: 6.75"(H) x 2.125"(W) x 8.25"(L)
MOUNTING: VERTICAL OR HORIZONTAL

The Pinnacle. The top. The leader in optical storage. Since 1988, Pinnacle's been the world's leader in optical storage solutions, shipping more systems than any other company.

Introducing the Pinnacle Micro REO-130S rewritable optical drive featuring the new Sony 3.5" mechanism. With its 38 msec access time, the REO-130S is the perfect storage solution for personal computing, desktop publishing, multimedia, data distribution and backup.

Company	Per Disk Price	Per Disk Capacity	Price For 5 Disks	Capacity Of 5 Disks	Drive Price
Pinnacle Micro REO-130S	\$ 79	128 MB	\$ 395	640 MB	\$1995
Imega Bernoulli® 90	229	90 MB	1145	450 MB	1149
Syquest™ (PLI) 88	229	88 MB	1190	440 MB	1199

Pricing advantage over Bernoulli® and Syquest™. Pinnacle's REO-130S offers a lower cost per megabyte compared to its magnetic storage competition. Users now need fewer disks while getting more storage capacity at a lower price.

Trademark Owners: REO-130S of Pinnacle Micro, Inc.; PLI of Peripheral Lond, Inc.; Syquest of Syquest Corp. Registered Owners: Bernoulli of Imega; Pricing acquired directly from manufacturers on 11-5-91.

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Circle 266 on reader service card

ACLE.



Optical Technology has distinct advantages over the Bernoulli® and Syquest™ technology. Since optical drives use laser technology to store information there is no chance of head crashes. 3.5" optical has a much smaller footprint than 5.25" magnetic but holds 40% more data.

Reliability of optical media is 15 years (shelf life) - that's 3 times longer than Bernoulli® and Syquest™ magnetic disks. Since the 3.5" cartridges are removable, optical remains the most secure way of storing your data into the future.

Media Standards for 3.5" optical disks have both ISO and ANSI standards to support the technology, while Bernoulli® and Syquest™ have none. Each 3.5" disk can be recognized in any 3.5" ISO/ANSI standard optical drive.

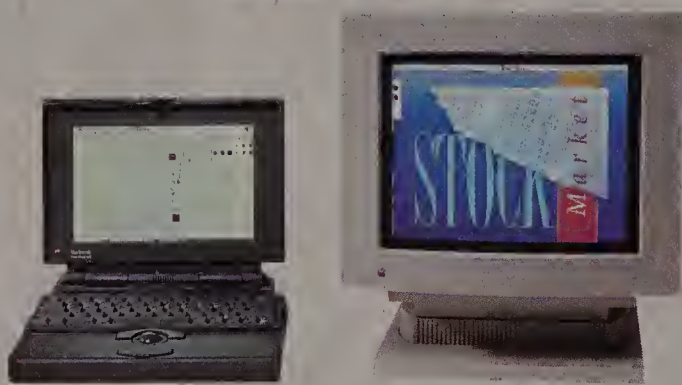
The Pinnacle Advantage is clear. Pinnacle Micro dominates the optical storage industry by offering the largest selection of 3.5" and 5.25" optical drives and disk changers. Interface kits are available for MAC, SUN, DEC, IBM and compatibles. The Pinnacle. Your next storage system.

PINNACLE MICRO

THE OPTICAL STORAGE COMPANY



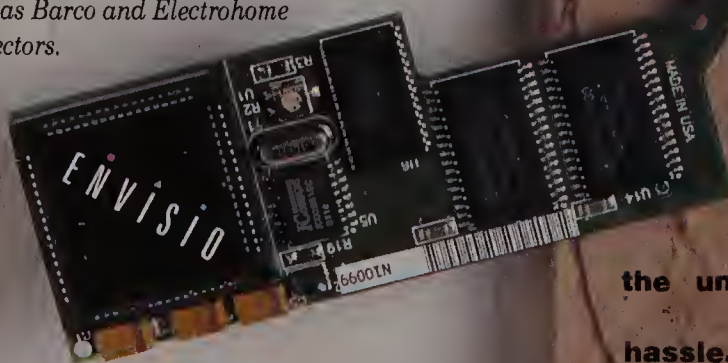
DOES THE POWERBOOK HAVE ITS LIMITS? NOT ANYMORE.



The Envisio Display Adaptor 030 enables you to use color applications and view 256 colors on displays like the Apple 13" RGB and VGA monitors.



Envisio NoteBook Display Adaptors work with most Apple and VGA compatible LCD projection panels, as well as Barco and Electrohome projectors.



You've got to love the PowerBook. Its innovations can take your work to the cutting edge. But with Envisio's NoteBook Display Adaptors, you can go further still. Now you've got the power to drive a range of external monitors and projectors. Suddenly, you've got a powerful desktop computer. A persuasive presentation tool. Connect to a full or two-page display, and you can view one or two 8.5" x 11" pages at once. And by connecting to an LCD overhead or RGB projector, you can share your work with an audience. Use NoteBook Display Adaptor 030 and you can view or project 256 brilliant colors on Apple's RGB Display or VGA monitor. And fast? It's the obvious choice

for animation and QuickTime. The PowerBook means freedom, so of course Envisio NoteBook Display Adaptors reside inside the unit. No external hardware, no hassle.

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End users circle 222 on reader service card

Dealers circle 224 on reader service card



RICK SAVAGE USES SURFACEVIEW TO ANALYZE THE RESULTS OF LASER EXPERIMENTS AT UCLA.

On the Surface

National Instruments' LabView has an open architecture for adding modules called virtual instruments (VIs). One of the most interesting VIs is Metric Systems' SurfaceView, which plots three-dimensional wire-frames inside LabView from data from instruments or generated by LabView.

SurfaceView provides background grids, user-definable axes, and tools for rotating the plot or changing point of view. SurfaceView's VIs can be incorporated into the interface of a custom LabView application. SurfaceView lists for \$250; LabView lists for \$1995. Metric Systems, 512/388-4458; National Instruments, 512/794-0100.—D.L.

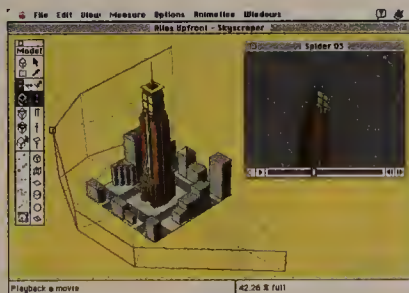
Xante Printer Does 600 DPI

Xante Corporation, maker of printer accelerators, has introduced its first complete printer, the 600-dpi Accel-a-Writer 8000. The 8-ppm printer includes a fast RISC processor, 6MB of RAM, and Xante's new Virtual Disk Technology, which uses optional Flash EPROM, instead of a hard drive, to store fonts. Flash EPROM is ROM that can be erased and rewritten many times as fonts are downloaded from the Mac. The EPROM stores the fonts until they are written over when other fonts are desired.

Enough EPROM to store 15 additional fonts lists for \$100, while enough to store 30 additional fonts lists for \$200. The printer comes standard with 35 resident fonts without using the Virtual Disk Technology. The Accel-a-Writer 8000 also has a SCSI port for attaching a hard drive. Now shipping, the printer lists for \$4495. Xante, 205/476-8189.—T.M.

Upfront and Close

Alias Research's Style division is preparing version 2 of Upfront, its 3-D architectural and conceptual solid-modeling package. New features in Upfront include Virtual Graffiti, which allows patterns or graphics mapped onto surfaces to retain their proper perspective when the point of view changes—this is especially useful for adding signage to a model without using 3-D letters—and Spider Vision, a refined method of controlling fly-through animations. Version 2 adds a true double-wall tool that eliminates the



ALIAS UPFRONT 2.0 WITH SPIDER VISION—A SERIES OF LINES DESCRIBING THE PATH OF A FLY-THROUGH.

need to substitute vertical boxes for walls when constructing buildings, and that can import 3-D DXF files and export QuickTime movies. It will probably list for \$895. Alias, 416/362-9181.—D.L.

Signs of the Times

How can taxi companies, department stores, and universities generate the hundreds of signs they need? They could turn to Amiable Technologies' FlexiSign. Unlike proprietary sign-making systems, FlexiSign uses standard fonts and can import illustrations from other graphics programs. It can drive machines that rout and emboss hard surfaces, or that cut colored adhesive vinyl or rubber sand-blasting stencils (it supports most makes of machining



USING FLEXISIGN TO PREPARE A SIGN WITH MULTIPLE LAYERS OF ADHESIVE VINYL.

ANALYSIS

Managing Personal What?

What blend of calendar keeper, contact manager, and miscellaneous-junk repository qualifies as a personal information manager, or PIM? There are many PIMs for the Mac, all of them different. For example, After Hours Software's TouchBase (\$125) is an electronic address book; Attain's In Control (\$129.95) is a malleable to-do list; Bananafish Software's ThoughtPattern (\$149.95) is an unstructured database; and Chena Software's Fair Witness (\$495) is almost a full-fledged project-management package.

Pastel's DayMaker (\$99) provides the best blend of

calendar, reminders, and miscellaneous storage, and—here's the personal in PIM—DayMaker provides great flexibility in categorizing, selecting, and viewing information. But it may face a serious challenge in features, if not in price, from After Hours' DateBook (\$125), when combined with TouchBase, which provides access to contact info from inside a calendar and can display a to-do list side by side with a schedule. After Hours, 818/780-2220; Attain, 617/547-2188; Bananafish, 415/929-8135; Chena, 215/770-1210; Pastel, 212/941-7500.—D.L.



WARD SCHUMAKER

News



VIRUS WATCH

CURRENT VIRUSES, TROJAN HORSES, AND WORMS

MBDF

TYPE: Virus

FIRST LISTED IN VIRUS WATCH: 6/92

INFO: Initially distributed via trojan horse program called Tetricycle, but can spread like other viruses

IMPACT: Does not destroy data; may disable applications

Zuc C

TYPE: Virus

FIRST LISTED IN VIRUS WATCH: 10/91

INFO: A Zuc clone

IMPACT: Nondestructive; infects applications and system files; renders cursor inoperable

HC

TYPE: Data Virus

FIRST LISTED IN VIRUS WATCH: 6/91

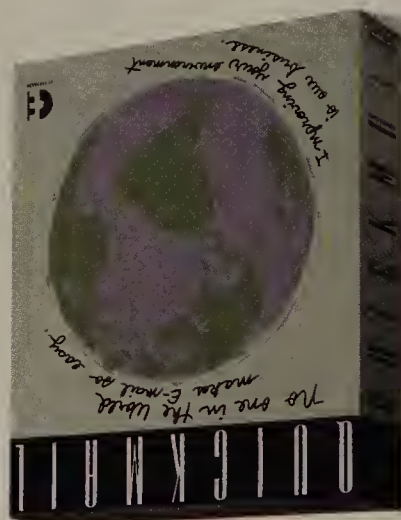
INFO: Infects HyperCard stacks

IMPACT: Causes the Mac to hum oddly

tools). Cutting signs requires some special techniques, which FlexiSign can apply. For example, colors must be separated into layers with the biggest (usually the sign's background color) on the bottom and the smallest (usually the letters) on the top. FlexiSign also has tools designed for drawing, layout, and alignment, and for distorting type.

FlexiSign lists for \$1995; the \$599 FlexiCut can cut illustrations created in other Macintosh software but lacks FlexiSign's high-end features. Amiable Technologies, 215/222-9066.—D.L.

Quick, Who's Number One In E-mail?



(If you guessed QuickMail™, you're right.)



That's easy. According to the experts at PC Week (1992 Analyst's Choice) and Macworld (1992 Editors' Choice Award), the #1 Multiplatform E-mail system is QuickMail. They agreed that, for ease-of-use, flexibility and connectivity, no E-mail communicates better across the most sophisticated environments—Macintosh®, DOS and Windows™ 3.x. And once you start using QuickMail, you'll agree—no other E-mail system works



so well for your entire organization. Here are some more numbers you should know: call 1-800-523-7638 and ask for Dept. CE31 to receive more information on QuickMail, or for the name of a dealer near you. For more information on the QuickMail International Distributor network, call 515-224-1995, or fax us at 515-224-4534.

Improving your environment is our business.SM



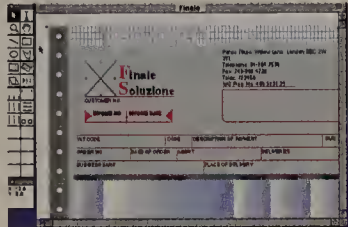
Back in Form

The much-heralded, never-arrived Mac-based electronic forms market suffered from a confused identity. Would electronic forms be a front end for databases? Or would office workers design forms, laser print them, and fill them out with a pen?

Neither, says Purup Electronics, which sells dedicated forms-design workstations. Its recently unbundled Mac software, FormsExpert, is aimed at skilled forms designers who create business forms for traditional printing methods.

To that end, FormsExpert's high-end features include support for tear-off stubs; designing in perforations, glue lines, and crop marks; making every edge of a box a different line weight; and panto-graphs (a repeated background pattern, commonly seen on checks). FormsExpert can rotate text to .01 of a degree, and choke and trap color separations.

FormsExpert costs \$750 and is available only through service bureaus that own Purup imagesetters. Purup Electronics, 612/646-3388.—D.L.



FORMSEXPERT FORMS CAN HAVE SPROCKET HOLES AND BOXES WITH DIFFERENT TOP AND BOTTOM CORNERS.

U.S. Robotics Enters Mac Market

Modem vendor U.S. Robotics has brought out its first Mac-specific products: a 2400-bps fax modem and a 14.4Kbps fax modem. Called the Sportster 2400 Mac&Fax and the Sportster 14,400 Mac&Fax, both support the 9600-bps Group III fax standard.

The Sportster 14,400 includes V.32bis at 14,400 bps, while the Sportster 2400 offers the same standard at 2400 bps. Both fax modems support delayed transmission and group broadcasting of faxes. The two devices come with a Mac-compatible cable, an RJ-11 phone cord, and FAXSTF software from STF Technologies. The \$549 Sportster 14,400 and \$329 Sportster 2400 fax modems should both begin shipping in the second quarter. U.S. Robotics, 708/982-5010.—T.M.



TOM GIBSON

THE SPORTSTER 14,400 MAC&FAX SUPPORTS DELAYED TRANSMISSION AND GROUP SENDING OF FAXES.

Low-Cost PostScript 2 Color Printer

Tektronix has broken new ground with its Phaser II PXe, a 300-dpi thermal-wax transfer printer that incorporates Adobe PostScript Level 2 and lists for \$4995. It also includes Tek's TekColor PS version 2 color-matching software.

The networkable printer contains a parallel port, a serial



STEVEN BLOCH

THE TEKTRONIX PHASER II PXE COLOR PRINTER CREATES POSTSCRIPT LEVEL 2 OUTPUT AT 300 DPI.

port, and an AppleTalk port and works with Tektronix's new 4511A Ethernet adapter for TCP/IP networks. The Ethernet adapter lists for \$1495 and is available now. The Phaser II PXe printer is also currently shipping. Tektronix, 503/682-7377.—T.M.

Darwin on a Disk

"We cannot speculate on man's position in . . . nature . . . while we keep his highest faculties out of our sight. Strip him of these faculties and he becomes entirely bestial." So said the outraged Reverend Adam Sedgwick in his review of Charles Darwin's *The Origin of Species*. Sedgwick's review can be found in Darwin, a \$29.95 HyperCard

News

stack, along with the reviews of Darwin's adherents and other critics. The stack includes Darwin's theories; the history of his life; the social, religious, and scientific context of his work in early nineteenth-century England; and an assessment of his works' impact in the twentieth century. Chariot Software, 619/298-0202.—ANN GARRISON

TREND

PSI Adds OCR to Fax Modems

PSI Integration has announced a pair of internal fax modems for the PowerBooks, and software that adds OCR capability to its own and other fax modems for Macs. The Group III-compatible fax modems are the PowerModem 96/96, which sends and receives data or faxes at 9600 bps, and the PowerModem 10/42, which sends and receives faxes at 9600 bps and data at 2400 bps. The \$699 PowerModem 96/96 supports the V.42 and MNP Class 5 protocols; the \$399 PowerModem 10/24 offers V.42, V.23, and MNP Class 10 support. The V.42bis protocol allows both the fax modems to effectively quadruple their data-transmission speed. The PowerModem 10/24 is shipping, while the PowerModem 96/96 should ship in May.

The OCR software, called FaxOCR, senses if text is received at 200 dpi by 200 dpi or at 200 dpi by 100 dpi. It converts the fax into a Mac file. FaxOCR requires an 030-based Mac running System 7. The list price for FaxOCR was not expected to exceed \$199. It should ship in the second quarter. PSI, 408/559-8544.—T.M.



BUG REPORT

PowerBooks The PowerBook does not function correctly with MIDI instruments. Apple and other sources disagree over the cause—it may be a hardware problem affecting the serial port or a software problem.

AutoDoubler 1.0 through 1.03 Problems occur during background printing and with DiskExpress, AppleShare, and MPW (Macintosh Programmer's Workshop). Salient Software says patches for upgrading to 1.04 or 1.05 were sent to all registered owners and are available on request or from the online services.

Alarming Events 1.03 Incompatible with System 7 Tune-Up. Version 1.1 will be available free online or for \$15 to owners who request it from CE Software.

Now Menus This module of Now Utilities 3.01 crashes when accessing an alias whose original file has been moved or deleted. Version 3.02 will be available free online or for \$5 to owners who request it from Now Software.

MacInTax 1991 Problems with installation and crashes in some complex situations will be fixed in an upgrade that ChipSoft will send to all registered users at no charge. Version number not set at press time.

Symantec AntiVirus for Macintosh Versions 3.0 through 3.06 crash with QuickTime installed if file-sharing is enabled. Symantec is working on a free bug fix. Version number not set at press time.

MACWORLD WILL SEND YOU A BUG REPORT T-SHIRT IF YOU ARE THE FIRST PERSON TO INFORM US OF A SERIOUS, REPRODUCIBLE BUG THAT WE REPORT IN THIS COLUMN. SEE HOW TO CONTACT MACWORLD.

TelePort/FullFax




Think of it as the Macintosh of fax.

Everything you imagined a fax modem could be

From the hardware to the human interface, everything about TelePort/FullFax™ is as easy to use and productive as your Macintosh. Our powerful GlobalFax™ software adds FAX to the menu bar of all your applications, so sending a fax is a snap. TelePort/FullFax plugs into an ADB port like the mouse, freeing up your serial port. And there are no batteries or power supplies. It also doubles as an MNP5 error-correcting data modem.

Wake up your Macintosh

On an incoming fax call, TelePort/FullFax powers up your Macintosh II family computer to

receive a fax. And your  icon flashes to inform you that a fax has been received. You can forward a fax to other destinations, and even have all incoming faxes automatically printed.

One line for voice and fax

TelePort/FullFax eliminates the hassle and expense of separate phone lines. A built-in phone/fax switch lets you share a single line for both voice and fax calls.

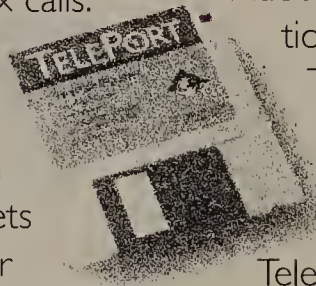
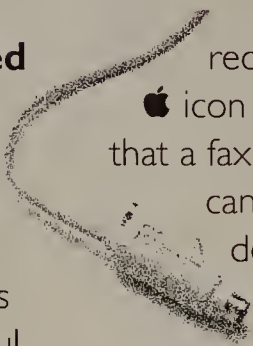
Sophisticated software that makes life simple

GlobalFax software lets you schedule a fax for an optimum time, reschedule or

change a destination, and send to multiple or group destinations. Create custom cover sheets and let the Macintosh complete them for you each time you fax. You can even "envelope" documents from multiple applications and send them in one fax.

Welcome to the Global Village

We brought you TelePort, MacUser's "Best Communications Product of the Year." The tradition continues with TelePort/FullFax and GlobalFax software. For the name of your local TelePort dealer, call **1-800-736-4821** today, Pacific time.



GLOBAL VILLAGE
COMMUNICATION

Circle 9 on reader service card

All product names are trademarks of their respective manufacturers.

Get Turbo-Charged



and get your chance to win!

Register for hot prizes in the Get Turbo-Charged Value Sweepstakes.



The Grand Prize includes the incredible new TI microLaser™ Turbo. PLUS...



Grand Prize winner also gets a choice between the TI TravelMate™ 3000 WinSX™ or Apple Macintosh IIx™ PLUS...



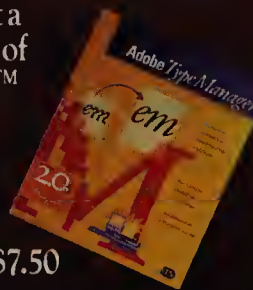
Over \$2,000 worth of publishing software: Adobe® Illustrator™, Corel Draw® and Aldus® PageMaker®!

Now between April 1, and June 30, 1992, when you see your TI dealer for a demo of the new microLaser Turbo or microLaser XL Turbo, you can register in the Get Turbo-Charged Value Sweepstakes. There's no purchase necessary.

The lucky Grand Prize winner drives off with a TI microLaser Turbo printer and a choice of the hottest computers on the market—the award-winning TI TravelMate 3000 WinSX or the Apple Macintosh IIx— together with three of the most popular desktop publishing software packages, Aldus PageMaker, Adobe Illustrator and Corel Draw.

Coming in second looks pretty hot, too. The Second Prize winner can choose between the TI TravelMate 3000 WinSX or the Apple Macintosh IIx.

After your test drive, if you buy a TI microLaser Turbo or microLaser XL Turbo loaded with PostScript® software from Adobe, you'll get a coupon for a free copy of Adobe Type Manager™ (ATM) software and Adobe Garamond Font Package! That's a total retail value of \$346—you pay just a \$7.50



shipping and handling charge. Proving that you're always a winner when you choose TI.

Your dealer has all the details on the Get Turbo-Charged Value Sweepstakes. So sprint in today to see the best value in super-fast PostScript printing race through graphics software faster than other printers. And get your chance to win.

For the name of your nearest TI dealer, dial:

1-800-527-3500

**TEXAS
INSTRUMENTS**



The Grand Prize has an approximate retail value of \$8,350. Second Prize has an approximate retail value of \$4,000. Promotion will be supported by all participating dealers in the U.S. and Canada. Void in Quebec. Canadian residents must correctly answer a skill-testing question to win. In Ohio or Michigan, you may also call 1-800-527-3500 for an entry form. microLaser, TravelMate and WinSX are trademarks of Texas Instruments Incorporated. Apple Macintosh IIx is a registered trademark of Apple Computer, Inc. Adobe, PostScript and the PostScript logo are registered trademarks and Adobe Type Manager and Adobe Illustrator are trademarks of Adobe Systems Incorporated. Aldus and PageMaker are registered trademarks of Aldus Corporation. Corel Draw is a property of Corel Systems Corporation.

TypeReader is a new omnifont optical character recognition package that publisher ExperVision claims is accurate enough for reading faxes, photocopies, and newspapers because it was developed to read 7000 kanji characters. The first version is for Latin-alphabet languages, with a kanji version to ship later.

Patching Genes

One problem is linking the fragments of sequences found into genetically meaningful longer sequences. Sequencher can examine large sets of fragments to find overlapping regions, creating an on-screen genetic map of ways to stitch the fragments together to make a larger gene.

[illegible]

bases for contamination with the special small sequences that are used in the sequencing experiment. The program performs standard types of sequence manipulation with graphical views of gene maps and produces publication-ready output. Gene Codes, 313/769-7249.


Copyright Database

How will copyright law apply when music, print, video, photos, and art are all mass-marketed in multimedia products? New York University's Interactive Telecommunications Program (ITP) has established a Copyright Division, headed by writer and lawyer Donna Demac, to follow these issues as they evolve. One project will be Rightsbase, a multimedia database of information about U.S. copyright law, case studies, and current developments. Samples of creative work in question will be included to clarify the issues. The database will be accessible via modem, and callers will be able to share information. Professor Demac is at 212/998-1882.—ANN GARRISON

Mister X

The angst-ridden underground comic book hero Mister X has escaped the confines of the printed page to find himself standing high above the city on a ledge of a building, with the wind blowing his tie, and with eerie voice-over narration and a voice of his own. On this CD ROM disk, every page of one Mister X issue has become a set of animated frames, scanned in from the original comic book artwork, and with stereo sound added. If you prefer your Mister X in Japanese, you can start up the CD ROM so that it shows Japanese subtitles. The software requires a Mac II, a CD ROM player, System 6.0, and 4MB of RAM. \$29.95 from Educorp, 619/536-9999.

—CAROLYN BICKFORD

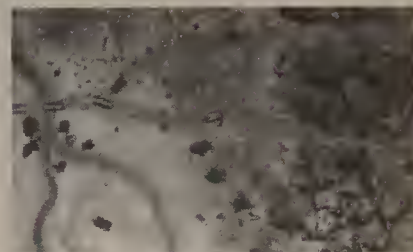


Low-Cost Landslide

As Apple expands its selection of less-expensive Macs, software vendors are pricing products to match. Softsync has announced a line of under-\$50 products (see *Mac-Bulletin*, April 1992); Claris dropped the price on MacWrite II to \$129 from \$249 (Claris has not decided if MacWrite II will survive after MacWrite Pro ships); and Paragon Concepts shipped the powerful Nisus Compact for \$150 (see *Mac-world News*, May 1991). Now WordPerfect Corporation is releasing the \$199 LetterPerfect, which is much like WordPerfect without macros, drawing tools, and a few other pieces; and newcomer Nest Software is developing the \$149 MacQuill, which combines a word processor mode with a page-layout mode. Claris, 408/727-8227; Nest Software, 408/441-1944; Paragon Concepts, 619/481-1477; Softsync, 305/444-0080; WordPerfect, 801/222-1000.—D.L.

Intelligent Vision

If you need to find a needle in a haystack, the Adaptive Learning Image Analysis System (ALIAS—no relation to the 3-D vendor Alias Research) might be able to find it. ALIAS is a shell for developing image-analysis applications for such tasks as making change machines able to distinguish photocopied bills, analyzing print jobs as they come off a press to look for smeared ink, and detecting vehicles in aerial photos of a desert. Once you train a system, its database and knowledge can be moved to other devices.



CAN YOU DISTINGUISH TANKS
FROM ROCKS IN THIS AERIAL
PHOTO? HINT: THE TANKS ARE
ON THE ROADS.

ALIAS runs on Pacific Parallel's coprocessor boards (see *Macworld News*, March 1992). Source code is available for other platforms. Cost depends on application. Alias, 703/313-9520.—D.L.

Technology Tepee

Does TV compel us to shop? Are we trapped by technology beyond our control? Recent visitors to San Francisco's Anon Salon discussed these questions on TPTV, a QuickTime video bulletin board set up inside a tepee. In TPTV's main window they saw text and animations based on Jerry Mander's new book, *In the Absence of the Sacred*, and a camera recorded their comments as QuickTime movies for later users. The bulletin board was created by multimedia artists and producers Abbe Don, Mark Petrakis, and Nick West, and interface designer Mitch Yawitz, a member of Apple's QuickTime team. Nick West is at 415/775-7089.

—ANN GARRISON



TPTV WATCHERS' COMMENTS
ARE STORED AS QUICKTIME
MOVIES; JUST CLICK TO HEAR
WHAT THEY SAID.



If there were a printer that could give you this kind of color, would you still make your presentations in black and white?

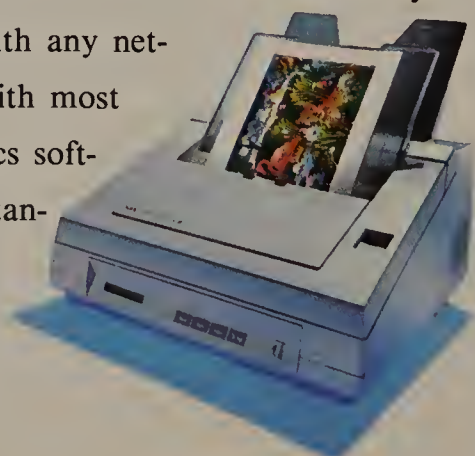
Do your business presentations go in one eye and out the other? The Colormate™ PS can easily and affordably give them the impact they deserve. Enhancing your work with truly amazing color, from brilliant primaries to soft pastels. All Pantone® approved.

The Colormate PS integrates readily with any network, PC or Mac. And it's compatible with most popular business presentation and graphics software. Of course, Adobe® PostScript® is standard. The Colormate PS comes in two

models—the economical Model 40 with 4MB of memory and 17 resident fonts, and the fully featured Model 80 with 8MB of memory and 35 resident fonts. Both feature reliable 300 DPI thermal transfer technology.

For your free Color Presentations Guide and more information, call 1-800-NEC-INFO. Or call NEC FastFacts, 1-800-366-0476, document #26567, for info via fax.

After all, the world isn't black and white, why should your presentations be?



Circle 180 on reader service card

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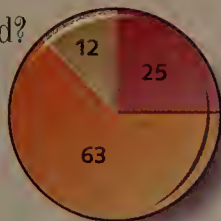
C&C Computers and Communications

NEC

Survey: Virus Problems in Organizations

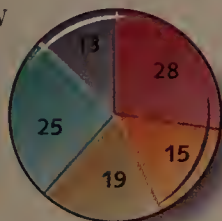
1. Virus problems experienced?

Yes
No
Other



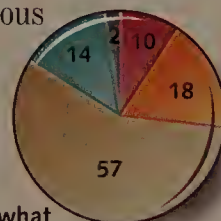
2. If yes, how many in the last 12 months?

1
2
3-5
6 or more
Don't know



3. How serious was your problem?

Very
Somewhat
Not very
Not at all
Don't know



This month's survey is based on telephone interviews with 500 subscribers. (Percent totals may not equal 100 due to rounding.)

Survey: Bug Problems in Organizations

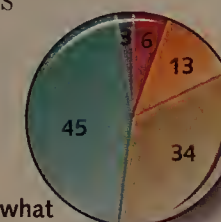
How many bugs in the last 12 months?

None
1
2
3-5
6 or more
Don't know



How serious was your problem?

Very
Somewhat
Not very
Not at all
Don't know



This month's survey is based on telephone interviews with 500 subscribers. (Percent totals may not equal 100 due to rounding.)



ROBERT HOLMGREN

HIGH TECH CENTER INSTRUCTOR ALICE ROSE (TOP) WITH STUDENTS JENNIE SILVA AND CHARLES WILSON.

High-Tech Help

Angela Horne entered college never having written an essay, because of a learning disability which had her struggling just to arrange words on paper. An otherwise apt 18-year-old, Horne wrote her first essay on a Mac using grammar and spelling checkers—and with help from Alice Rose, an instructor at the High Tech Center at De Anza College in Cupertino, California. The center uses computers to assist disabled students, but its main mission is to train faculty from California's community colleges to do the same. With their help, the visually impaired learn to use software that makes visual interfaces audible, students with reading difficulties learn to use software that isolates text into comprehensible units, and students with physical disabilities learn to enter data with Morse code—faster than touch typists. The High Tech Center is at 408/996-4636.

—ANN GARRISON

printer language for DOS machines. PostScript Level 2 also provides compression for faster data transmission, and other speed improvements.

The HP LaserJet PostScript Cartridge Plus has a suggested list price of \$695. It requires at least 2MB of RAM in the printer. HP has also cut the price of its existing PostScript Level 1 cartridge from \$695 to \$495. Hewlett-Packard, 800/752-0900, 503/750-5856 for upgrades.—T.M.

News



BETA WAIT

Long-awaited products

Acius's 4D Server

Shown publicly January 1991. Current ship date projected: spring 1992 in France, three months later in United States.

FoxPro/Mac

Discussed publicly winter 1990/91; Fox says will go to beta soon, no ship date projected.

Interleaf 5

Discussed publicly October 1990. Current ship date projected: summer 1992.

Clarix's MacWrite Pro

Announced spring 1991. Current ship date projected: late summer 1992.

AEC's FilePower

Announced August 1991; planned to ship winter 1991/92. Current ship date projected: summer 1992.

Alysis's SuperDisk 2.0

Original ship date: September 1991. Current ship date projected: early spring 1992.

Atto Ships

SCSI-2 Board

Atto Technology is now offering the SiliconExpress II, a NuBus board that supports data transfers up to 10MB per second when used with SCSI-2 storage devices. Acting as a bus master, the SiliconExpress II gets around the NuBus/CPU bottleneck, freeing the CPU. The Silicon Express II also supports Block Transfer Mode on the Quadras for faster, burst data transmission. The board links to seven SCSI drives in addition to the Mac's support for seven SCSI devices. More than one SiliconExpress II can be used to support many drives.

The SiliconExpress II has a list price of \$1295. Atto, 716/688-4259.—T.M.

Office Talk

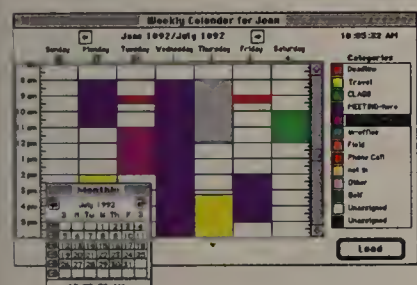
Cornice Software's Officemaster adds a new twist to contact management and work planning. A user can link a contact history with a reminder to call someone, or link a scheduled meeting with notes on previous meetings. Using the program's built-in messaging, someone in a networked group sharing an Officemaster system could send out a meeting reminder linked with minutes from previous meetings on the same topic.

Officemaster lacks gate-

ways to full-featured E-mail packages, which Cornice expects Apple's Open Collaboration Environment to provide. Future plans also call for a project-management add-on, proxy support (that is, letting an assistant manage someone's schedule), and remote-access capability. Officemaster lists for \$179 for one user, \$1299 for five, and \$1799 for ten. Cornice Software, 714/985-8323.—D.L.

Cartridge Adds PostScript Level 2 to LaserJets

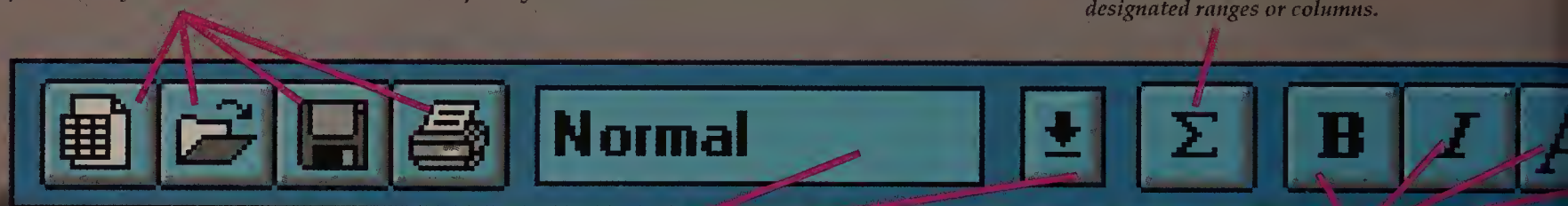
Hewlett-Packard has begun shipping the HP LaserJet PostScript Cartridge Plus, which adds Adobe PostScript Level 2 to HP's popular LaserJet III, LaserJet IIIP, and LaserJet IIID printers. The cartridge supports automatic language switching between PostScript and HP's PCL 5, the widespread



MANY KINDS OF MEETINGS. OFFICEMASTER CAN DISPLAY A MONTH VIEW AND A WEEK VIEW SIDE BY SIDE.

Microsoft Excel 4.0 – See

Click on these handy icons to create a new file, open an existing file, access your disk drives and directories, or print your work.



Click on the Autosum icon to sum designated ranges or columns.

Set your style sheets, then simply pull down this menu to choose and apply them.

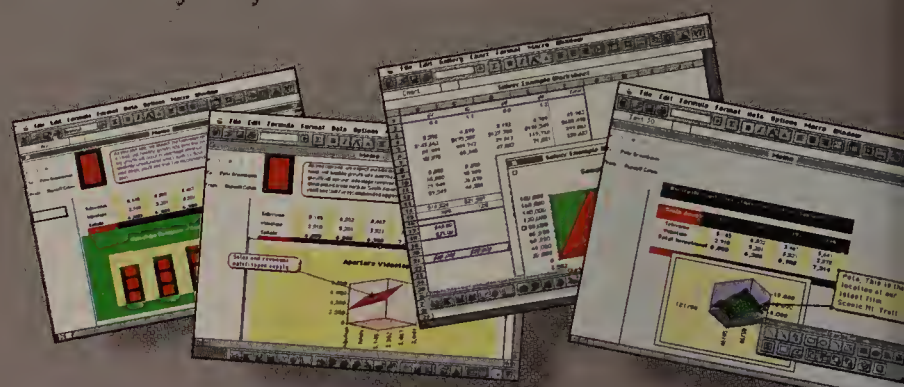
Use these icons to change typesets, or reduce or enlarge type.

Microsoft Excel for the Macintosh just got even better. The new version 4.0 adds to this already incredible program by giving you more powerful features that make everyday spreadsheet tasks easier than ever. Even more important, Excel 4.0 offers a whole new wealth of built-in intelligence features. So Excel can actually anticipate the kind of information you'll want, and then present it to you. And Excel 4.0 is designed to share information with other kinds of documents, and even across platforms. And that's just for starters!

A whole new level of easy.

Believe it or not, you can actually create a spreadsheet in just about 60 seconds with Microsoft Excel 4.0. New intuitive features replace the long, steep learning curve with quick and powerful commands that have you up and running in a flash!

- Use Excel's customizable **Toolbar** for one-step, on-screen access to the commands you most frequently use.
- **Autosum** lets you sum designated ranges or columns with a simple double-click.
- **Autofill** recognizes trends in your data, and extends them as far as you'd like.
- **Shortcut menus** pop up to give you instant access to common, context-sensitive commands.
- **Best Fit** automatically resizes columns to accommodate the widest entry.
- And the incredible new **Wizards** are always watching and waiting in the background, ready to guide you step-by-step through any complex task.



Powerful analytical tools put you in touch with your data.

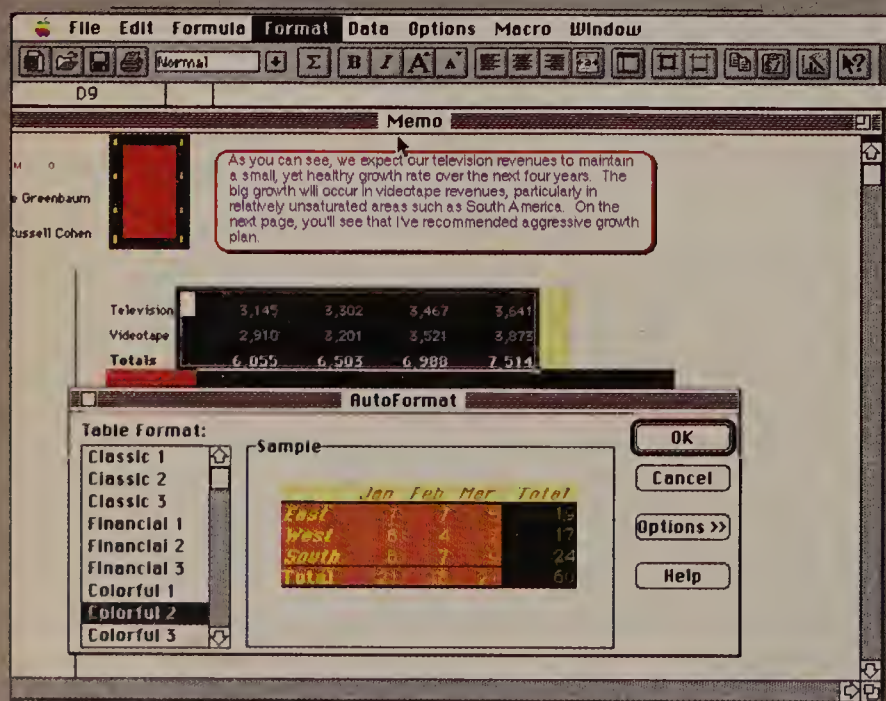
Microsoft has added a host of new analysis tools to Excel 4.0, giving you entirely new ways to view and analyze your data.

- Use the **Crosstabs** feature to create crosstab tables based on database entries that you can sort by any criteria.
- Store related worksheets together in a single file with **Workbooks**.
- **Consolidate** data from multiple worksheets, regardless of formatting, file type, or file location.
- The **Analysis ToolPak** includes the most extensive set of financial, statistical, engineering, and scientific tools that you will find in any spreadsheet.
- **Outlining** lets you expand or collapse your worksheet to view the desired level of detail.
- Plus the extraordinary **Scenario Manager**, which lets you create and save multiple "what if" scenarios and create a summary of these scenarios in just minutes.

Improved graphics tools and presentation support

Excel 4.0 gives you even greater control over how your finished documents will look. It provides everything you need to create dazzling reports, complete with charts, graphs, and notes or annotations.

- **Autoformat** gives you one-step access to 16 professionally designed spreadsheet formats.
- **Report Manager** lets you merge different sections of different spreadsheets to produce customized reports that you design.



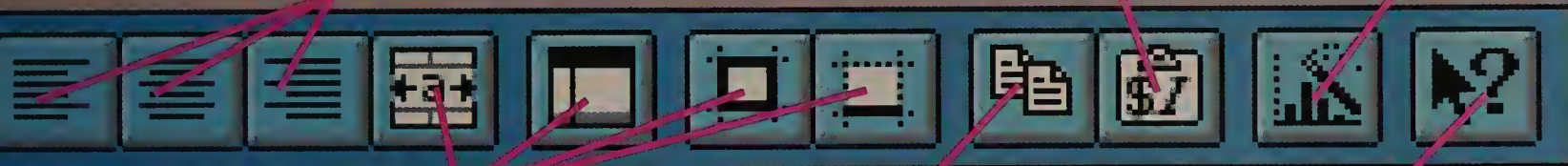
Autoformat lets you choose from 16 attractive, professionally-designed formats. Then apply the format you select to your worksheet with just a single mouse click.

Now easy power can be!

Your choice of alignment options — left, right or centered — are only a mouse-click away.

Click on this icon and your selected data will be copied right to the Windows clipboard.

Choose this icon, and you'll have a whole range of charting features at your disposal.



These formatting tools make it easy to add bars, outlines, underlines or borders anywhere on your spreadsheet.

Switch back and forth between spreadsheets with a simple mouse click here.

To access Excel's context-sensitive, on-line help, just double-click on this icon from wherever you are in the program.



The Spreadsheet for the Macintosh

- **Charting** lets you choose from over 90 chart options, including 3-D surface charts, wire charts, and radar charts.
- **Drawing** tools make it easy to highlight and annotate your spreadsheets and graphs with arrows, ovals, arcs, or rectangles, — all in one easy step.
- Use the built-in **Spelling Checker** to ensure that all your presentations and reports are letter perfect.

Smooth transition from Lotus 1-2-3

Excel's Custom Help for Lotus 1-2-3 lets you use your familiar 1-2-3 commands right within Excel. Excel will demonstrate its equivalent command, so you can learn as you work. Lotus files and spreadsheets can be imported right into Excel, and the program supports all Lotus file formats, so it's easy to convert your documents. Plus, there's a helpful, on-line tutorial for 1-2-3 users who want to switch without a fight.

Discover for yourself how easy spreadsheet power can be.
Order Microsoft Excel 4.0 today!

Microsoft Excel 4.0

BUS0223

Publisher: Microsoft

Suggested Retail: \$495

\$295

System requirements: 1 MB RAM (2 MB for System 7.0); hard disk drive; Finder 6.1 or later; System 6.0.2 or later.

Microsoft Excel 4.0 Upgrade for only \$99! Upgrade and SAVE!

If you're using a previous version of Excel, you can upgrade to Excel 4.0 at substantial savings off the regular price! To qualify, just mail or fax us the title page of your user manual, or the original program disk.

Microsoft Excel Live Upgrade

Qualifying products are any previous versions of Microsoft Excel. Offer expires 9/30/92. Note: if you purchased Microsoft Excel 3.0 after 2/15/92, the upgrade to version 4.0 is free, direct from Microsoft.

UPG0010 **\$99**



To order, call MacWarehouse at 1-800-255-6227

Many of our products come with a thirty day money back guarantee, if you are not completely satisfied. Ask for details when you place your order.

NEW VERSION!



The Norton Utilities for Macintosh 2.0

⑦ The Norton Utilities for Macintosh 2.0 combines and enhances the features from two award winning products: SUM II and Norton Utilities. The combination of these two products results in the first Macintosh utility software package to offer fully integrated advanced disk repair & recovery, automatic backup, data security, productivity tools and system enhancements in one informative, easy-to-use product. This unbeatable combination allows you to protect valuable data and make day-to-day functions a breeze. Whether working on your Macintosh at home or while networked into a corporate-wide system, if you own a hard drive, the Norton Utilities for Macintosh 2.0 is the product for you. **Publisher: Symantec UTI0151**

\$99

FileGuard 2.7

★★★★★

⑦ "It's sleek, fast, and safe. I highly recommend it." MacUser April 1991. Protect your Hard Drives and Partitions from unauthorized access (including security bypass with a system diskette), copying and erasure; Applications and File/Folders



(including system folder) from unauthorized access, deletion, and/or illegal copying; Desktop (including system folder) from alterations by unauthorized user; Keep an eye on System Usage with the system users log which continuously tracks user/group activity. System 7 compatible.

Publisher: ASD Software

Single User UTI0135 \$139



Lotus 1-2-3 For Macintosh

⑦ At last, a 1-2-3 spreadsheet that is designed exclusively for the Macintosh computer. 1-2-3 for Macintosh takes full advantage of the rich graphical environment of Macintosh while delivering significant new spreadsheet features. And of course it's compatible with other new versions of 1-2-3 and Excel. A whole new kind of 1-2-3 created expressly for Macintosh. The result is a rich design that makes even the most complex spreadsheet tasks easy. 1-2-3 for Macintosh sets a new standard for what a Macintosh spreadsheet should be. System requirements, any Macintosh with a hard disk. 2MB RAM under System 6 or later. 3 MB RAM under 7. **Publisher: Lotus Development BUS0188**

\$349

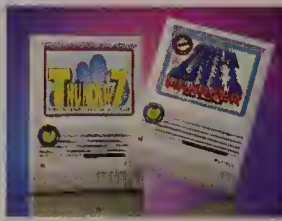
Init Manager 1.1 or Thunder 7 1.0.5

Init Manager 1.1

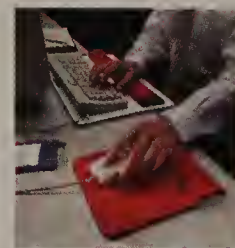
⑦ Full featured INIT control utility permits auto-disabling of crashing INITs, scanning and detection, on/off selection, ordering, grouping functions and more. Also shipped with a powerful system analyzer design to generate detailed diagnostic system reports. (CDEV) UTI0187 \$34.

Thunder 7 1.0.5 ⑦ Interactive spelling checker and thesaurus designed to provide a single dictionary to reduce disk space for all your applications and desk accessories. Complete with auto-correction glossary, search and replace, look-up thesaurus and readability analysis capabilities. (CDEV)

Publisher: Baseline SPL0029



\$56



WristSaver/ WristSaver MousePad

The WristSaver cradles your wrist with a contoured neoprene rubber pad and a nylon covering. It's ergonomically designed to

support your wrist at the proper angle to help avoid the pain associated with Carpal Tunnel Syndrome. The WristSaver MousePad provides a comfortable rest for your wrist, plus a conventional mouse pad. Simple finger movements replace sliding the entire arm or hand.

Manufacturer: LB Innovators

WristSaver MousePad ACC0635 \$15.

WristSaver ACC0560 \$15.

Bundle BND0033

(Available in Gray, Black, Red or Navy)

\$25



Software Bridge/Mac 2.0.1

⑦ Macintosh users translate between over 30 different Mac and PC word processing formats for over 800 possible translation paths. DOS to Mac translation is invisible; simply insert a DOS disk into a Mac SuperDrive, double-click on a DOS document, and Software Bridge automatically loads identifies, translates and launches it into your Mac format, ready to edit! Uses the Document Manager for one-step Mac to DOS, Mac to Mac, and DOS to DOS translation. Also translate files located on external DOS disk drives or file servers. "It's strongest in the field of reliable DOS-to-Mac conversions of complex documents" (MacWeek 11/6/90). Includes MountPC to access DOS disks from the Mac's Superdrive as if they were Mac disks.

Publisher: Argosy Software, Inc. COM0099

\$99

NEW

WindoWatch 1.52

⑦ Track the hours you spend on a project with WindoWatch. It's a must for professionals who bill their services by the hour (or minute). WindoWatch operates in the background, automatically generating a timesheet as you work. Use WindoWatch to collect and merge timesheets from team members over the network or export timesheet information to a spreadsheet. Don't miss any opportunity to accurately bill your clients. After all, time is money. **Publisher: ASD Software UTI0264**



Single User \$89



Ray Dream Designer 2.0

⑦ You don't have to settle for flat illustrations and designs any longer. Ray Dream Designer's drawing and text tools, for creating lines, circles, ellipses, polygons, Beziars, colors and shadings, are virtually the same as those in most 2D illustration programs. The only difference is, now your objects have the realistic look of three dimensions. Wrap them around an object or text for instant dimension. Comes with a library of 3D solid textures you can use as is or customize. Lightning, shadows, transparency, reflections and, best of all, perspective are all handled automatically. Requires: Mac II family with coprocessor, 32-bit QuickDraw, 4MB RAM and hard drive. **Publisher: Ray Dream GRA0292**

\$589

FREE

POWER USER'S TOOL KIT 7.0

If you're not already a collector of Steven Bobker's highly successful Power User's Tool Kit - compiled exclusively for MacWAREHOUSE - you'll want to start with version 7.0. It's stuffed with ten useful applications, utilities, desk accessories, INITs and System 7.0 extensions for your Macintosh. They're great productivity enhancers and you'll be surprised how easy they are to use.

Steven Bobker Presents THE POWER USER'S TOOL KIT

ALL NEW!
Includes:
• Save-a-Tree - so you can print out text-only files with reduced pages on the front side of one!
• LaunchINIT 2.0s - logs the activity of your Mac - vital if you take a computer tax deduction.
• Applicon - System 7.0 users can switch among open applications by clicking on tiles on your desktop. Plus much, much more.

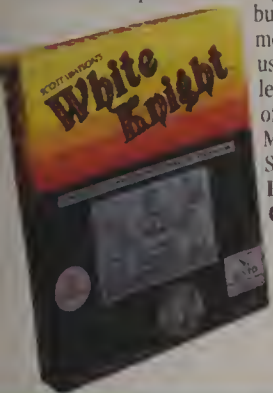
And the best thing is, the programs are shareware so you can try them FREE when you order from MacWAREHOUSE. You pay only \$1.50 shipping and handling if you want the disk. If you wish to continue using the software, some authors ask that you pay a small fee (\$5-\$25). All the details are explained on the disk, which is yours to keep. Please remember to ask for item # AAA 0013 when you order.

And For System 7.0 Users:
• Applicon Switch - among open applications by clicking on the tiles this time-saving utility creates on your desktop.
• Atlas This Drop - on icon on Atlas This and it will create an alias for it in your Apple menu.
• Helium-Toggle - Balloon Help on and off from your keyboard.
• And much, much more!

MacWAREHOUSE
1-800-255-6227

White Knight V.11

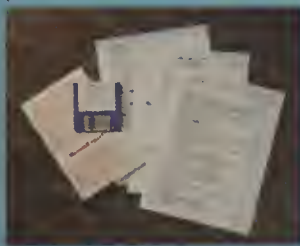
⑦ The perfect low-cost solution to almost any Mac telecommunicator's needs. Offers the kind of power associated with products costing hundreds of dollars more, but is easier to learn and more flexible. 270+ page user manual is geared to all levels of experience. Winner of 11 awards including MacWorld's World Class Software Award 1987-1991. **Publisher: FreeSoft COM0060**



\$85

RésuméExpert

⑦ Create job-winning résumés quickly with RésuméExpert. Ten editions available by profession. Each edition features 40+ professionally written and fully-formatted Microsoft Word résumé templates. Simple to use - just select a template and substitute your personal information. MacUser 10/89 awarded RésuméExpert 4 mice and raved about its "excellent" manual and writing tips. Also rated a top 200 software program by MacUser 12/89. Requires MS Word. System 7 compatible. **Publisher: A Lasting Impression BUS0087**



\$49ea.

Aldus SuperPaint or Aldus Gallery Effects*



Aldus SuperPaint 3.0

⑦ Five time winner of MacWorld magazine's World Class Award, new Aldus SuperPaint combines painting, drawing, and image enhancement, and includes 1 thru 24 bit color, textures, gradients, and EPS graphics. **GRA0112 \$133.**

Aldus Gallery Effects ⑦ 1991 MacUser's Editors' Choice Award for Best Visual Resource. Aldus Gallery Effects automatically transforms grayscale and color bitmap images into stunning, sophisticated art, with 16 master effects including Graphic Pen, Watercolor, and Charcoal. Works directly within programs like SuperPaint and PhotoShop, or as an application or DA.

Publisher: Aldus GRA0279



\$129*

FaxMania Business Fax Cover Sheets

⑦ FaxMania Business Fax Cover Sheets is an imaginative collection of 80 fax cover sheets designed for business, home, and fun. Send a Birthday fax and much more. The categories include: Meetings, Finances, Announcements, Ecology, International, Reminders, Invitations, Sports, Travel and more. The fax cover sheets are provided in word processing formats. The formats for the Macintosh include: WriteNow, MacPaint, MacWrite and MS Word. They can be edited, sent electronically or printed and used as paper faxes. **Publisher: I/Maker GRA0317**



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⑦ Nominated for MacUser's Editors Choice Award for Utility of the Year, Tiles puts everything you need at your fingertips! Whether you work with one file at a time or with several programs at once, you'll love Tiles. Set Tiles to create a single Tile for the project you're on. Later, when you need to get back to work, just click the Tile. Tiles automatically tracks and organizes what you need, from your favorite files and programs to entire projects. You can even use Tiles to launch your QuickKeys with a single click! UT10213



\$69

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Simple.**

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is our business™.**

Publisher:

CE SOFTWARE INC

NEW



MacUSA

⑦ Every Mac user who wants fast, accurate information on the 50 states and Puerto Rico, coupled with superb maps and graphics, will love MacUSA. Provides you with an instant profile of each state that includes: city locations, elevations and natural features; demographic, economic, political, climate and health data; state history, tourist attractions, and time zones; state flags and entire state songs; simple print and export capabilities. For students, travelers, business people, and those who just want to know more about the United States. MacPlus or later model computers with System 6.0.4 or later.

Publisher: PC Globe GRA0246

\$39

Run PC/Network

⑦ Connect any one of 10 Macs to a PC via modem or AppleTalk network to control virtually any DOS program. Run programs at full speed, access VGA graphics, extended/expanded memory and PC peripherals. Copy and paste text or graphics between programs, print DOS files onto your Mac printer. Transfer files, translate documents in either direction and mount DOS disks using included Software Bridge/Mac.

Publisher:
Argosy Software, Inc.
COM0098



\$279



Universal PowerCache

⑦ When you feel the need for speed, the award-winning PowerCache gives you the best combination of blazing-fast speeds (up to three times faster) and cost-effective prices. More important, it's guaranteed 100% compatible with ALL your software and hardware, while running at full speed. The same board fits seven different Macs (adapter required for non-IIci installations). Manufacturer: DayStar Digital 40MHz w/out 68882

\$949

Puzzle Master

⑦ Solve crossword puzzles, or create your own. Includes 250 of The New York Times® classic puzzles, 200 daily puzzles and 50 Sunday puzzles. Built-in timer and scoring system. ENT0383 \$29.

Canis

⑦ A new educational/reference program for current and prospective dog owners. Includes breed selection, health care, nutrition, and dazzling color pictures. ENT0384 \$25.

Casino Master

⑦ Offers all the fun of playing the odds in Las Vegas without the risks. Simulates the five most popular casino games: Blackjack, Craps, Roulette, Poker, and Baccarat. Publisher: Centron Software Deluxe Color Version ENT0289 \$45

Standard Version ENT0277



\$39

DiskFit Pro

⑦ For Finder-readable backup to floppies, cartridge or other hard disks, get DiskFit Pro. DiskFit Pro copies files from a hard disk to a "SmartSet" of floppies, and then updates the "SmartSet" with each subsequent backup. By replacing only the obsolete files in the backup set, DiskFit Pro keeps your SmartSet from growing every time you backup. Backups stay fast and backup sets compact. And since files are stored in Finder format, a click and drag is all it takes to restore files directly from the backup. System 6 compatible, System 7 savvy. Don't leave your data at risk, backup with DiskFit Pro. Publisher: Dantz Development UT10246

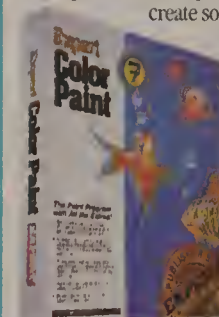
\$74



NEW

ExpertColor Paint™

⑦ ExpertColor Paint is a simple to use yet powerful color paint program with many extras including 32-bit color, image editing and multiple undo's. By using a vast array of painting tools, you can create great looking art. You won't believe how easy the customizable tools make painting. There are multiple adjustable paint brushes, spray paint, paint cans and more to help create sophisticated art or touch up existing pictures. It's like having a fully equipped art studio at your disposal. Offers advanced image editing features like blur and sharpening filters and includes a free bonus clip art disk (\$24.95 value). Publisher: Softsync, Inc. GRA0318



\$29

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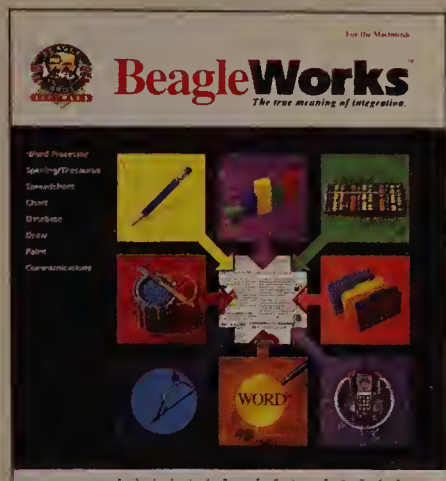
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MacPrint 1.3

Use a Macintosh with non-Apple printers. Print Mac applications on HP Laserjet, Deskjet or compatible printers including all Series IIs, IIIs and the Deskjet 500. Prints text and graphics at the printer's maximum resolution.

Does not require PostScript. Cable is included. Publisher: Insight Development UT10098

\$95



BeagleWorks

With the introduction of BeagleWorks, the true meaning of integrated software has finally been defined. BeagleWorks includes seven modules so fully integrated you can easily access the Word Processor, Database, Spreadsheet, Chart, Paint, Draw and Communications modules from anywhere in the program. Exclusive to BeagleWorks is a revolutionary technology called In-Context Editing™. This gives you the ability to access or create an item from one file without having to leave the module in which you are currently working. The word processor features irregular text wrap, multiple columns anywhere on the page. The spreadsheet boasts an automatic sum tool, as well as in-cell editing. And 256 custom colors are featured in all the modules except communications. Publisher: Beagle Brothers BUS0189

\$185

Active Memory 2.0

Turn your PowerBook into a power organizer with Active Memory! When traveling, manage info like sales leads, field results or travel expenses. Enter data your way in a free-form Info field. Once back at headquarters, remind networked co-workers about upcoming deadlines. Import contact lists and setup reminders to call them. For daytimers, use Active

Memory to print your things-to-do list or travel itinerary. Make it easier to manage your data in the office or on the road. Publisher: ASD Software BUS0207

\$125

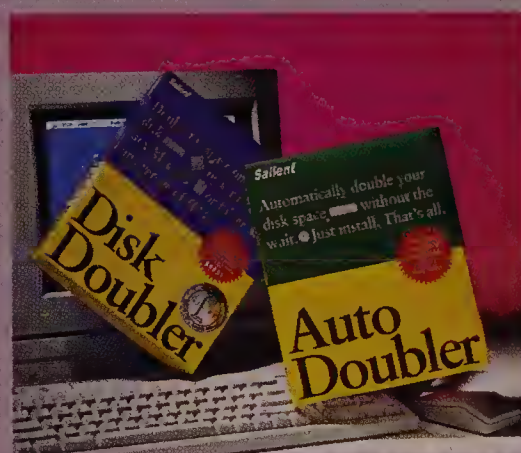
Star Trek Sound Clips

Enliven your next presentation with these official digital Star Trek Sound Clips. Both volumes include sound effects, music cues, and dialog from Star Trek the Original Television Series.

Now, you can slyly slip in the Transporter sound effect for a slide dissolve, or zap the Klingon competition with a phaser blast. They work with most desktop presentation and multimedia applications. The clips also work with SoundMaster (included) to replace those boring Mac System beeps with your favorite Star Trek sounds. Publisher: Sound Source

Unlimited Vol. 1:
The Logical Collection
ENT0418 \$29.
Vol. II: The Final Frontier
ENT0419

\$29



AutoDoubler

AutoDoubler is the easiest way to increase your hard disk capacity. It works in the background to automatically keep your hard disk compressed. It's lightning quick and completely transparent, so it won't interrupt your work. In fact, AutoDoubler's new patent-pending technique lets your Macintosh use files and applications while they are still compressed! It's fully compatible with almost all applications, desk accessories, and system extensions. UT10254 \$49.

DiskDoubler 3.7

DiskDoubler gives you total control of file compression-archiving for modem transfer, compressed backups, self-expanding files, and fast copying of files. AutoDoubler and DiskDoubler combined give you the ultimate in speed, convenience, and control. System 7 Savvy! Publisher: Salient UT10179

\$49

Canvas 3

Canvas 3 is fast, powerful, easy to learn and provides all the tools you'll need to create and print professional quality color or monochrome graphics. Use in a wide range of design projects including desktop publishing, technical illustration, design graphics, architectural rendering, engineering drawing, presentations, multimedia and general business graphics. Canvas 3 offers unparalleled productivity. Create illustrations from scratch with our new freehand tool, or scan existing artwork and let Canvas auto trace its outlines for you. System 7 Savvy! 1991 MacUser Editor's Choice Award.

Publisher:
Deneba Software
GRA0280



\$249

ULTRA 9600 Bundle

Hayes top Performer...

The Hayes ULTRA 96 comes with the award winning Smartcom II for the Macintosh software, RS232 cables, and HayesConnect software. ULTRA 96 practically operates without you! Automatic Feature Negotiation creates the best combination of speed, error-control, and data compression whenever you use your ULTRA modem. It achieves 100% error-control using both the V.42 standard and MNP 2-5 protocols, and 4 to 1 data compression for 38,400 bps throughput with V.42bis. HayesConnect allows users to share modems or other serial devices such as plotters or printers across and AppleTalk network. Manufacturer: Hayes MOD0065

\$749



Accountant, Inc. 3.0

"BEST ACCOUNTING PACKAGE" 1991 MacUser's Editors' Choice Award. More Features, more power, more flexibility. It's easy to use and gives you exceptional streamlining power. You only have to enter information once. Every transaction is automatically posted to your General Ledger. Accountant, Inc.'s new revolutionary System 7 design gives you the advantage of customizing your forms, screens and reports by hot linking with your favorite forms design, spreadsheet and database programs. You get Invoicing, Accounts Receivable, Inventory, Accounts payable, Check Writing, integrated General Ledger and Payroll. Accountant, Inc. is now available in single and multiuser versions. Publisher: Softsync, Inc. FIN0048



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BND0077	MF2DD 100PK	59.
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I/O Design, Inc.		
ACC0528	Ultimate Classic SE Carrying Case	65.
ACC0665	Notebook EX Carrying Case	75.
LB Innovators		
BND0033	WristSaver/MousePad Bundle-Red	25.
Targus, Ltd.		
ACC0252	MacPlus/SE Carry Case (black)	59.
ACC0675	Universal Notebook Case	69.

BUSINESS & PRESENTATION

AmazeInc		
7BUS0221	Cathy Daily Planner	39.
Ark Interface		
7BUS0220	WorkSpace	89.
ASD		
7BUS0207	Active Memory 2.0	125.
After Hours Software		
7DAT0076	TouchBASE 2.0	79.
A Lasting Impression		
7ResumExpert	Word 30/4.0 version, Cover Letters, Manager, Sales & Marketing, Students, Computer Science & Engineering, Financing & Banking	ea.49.
Aldus		
7BUS0066	Persuasion 2.1	325.
Attain		
7BUS0211	IN CONTROL 1.0	95.
Beagle Brothers		
7BUS0189	BeagleWorks	185.
7SID0006	BeagleWorks Competitive Upgrade	95.
CE Software		
7GRA0070	CalendarMaker 3.0	31.
Chena Software		
7BUS0208	Fair Witness 1.1	315.
Clarix		
7BUS0201	ClarixWorks	209.
7SID0002	ClarixWorks Trade-up	99.
7DAT0064	FileMaker Pro	205.
7UPG0005	FileMaker Pro Upgrade	99.
7BUS0058	MacProject II 2.5	345.
7BUS0178	Resolve	SPECIAL 175.
7SID0003	Resolve Trade-up	99.
7BUS0065	SmartForm Designer	289.
Data Description		
7STA0012	Data Desk 3.0	459.
JAM Software		
7DAC0033	Smart Alarms 3.1(1-4 users)	125.
Kaetron		
BUS021B	FlowChart Express	93.
Lotus Development Corporation		
7BUS0188	Lotus 1-2-3 for Macintosh	349.
7SID0004	Lotus 1-2-3 Competitive Upgrade	89.
Meca		
7FIN0039	A. Tobias' Managing Your Money 4.0	Call
Microsoft		
7BUS0223	Microsoft Excel 4.0	295.
7UPG0010	Microsoft Excel 4.0 Upgrade	99.
7BUS0008	Microsoft PowerPoint 2.01	245.
7BUS0181	Microsoft Project 1.1	445.
7BUS0186	Microsoft Schedule+ 5 Pack	125.
7BUS0014	Microsoft Works 2.0	155.
7BUS00BB	The Microsoft Office 2.0	475.
Now Software		
7BUS0212	Now Up to Date-single	65.
Pastel Development		
7BUS0199	DayMaker	65.
Power Up		
7BUS0153	Address Book Plus 2.0	63.
7BUS0073	Calendar Creator	44.
Reality Technologies		
7FIN006B	WealthBuilder (Mac)	95.
Round Lake Publishing		
7Legal LetterWorks	or Sales	ea. 45.
7BDK0007	LetterWorks	45.
Softsync Publishing		
7FIN0048	Accountant, Inc. 3.0	335.
Symantec Corporation		
7BUS0217	GreatWorks 2.0	199.
7SID0001	GreatWorks Sidegrade 2.0	85.
7BUS0055	More 3.1	265.
Synergy		
STA0018	Kaleidagraph 2.1	149.
Teleware, Inc.		
7FIN00B7	M.Y.D.B. 3.0	139.
Timeslips		
7BUS0043	Timeslips III 2.1	195.
T/Maker		
7BUS0193	The PowerBundle	159.
Visionary Software		
7BUS0190	First Things First 2.0	45.
Wyoming Software		
7FIN0013	Business Sense 1.5	129.

COMMUNICATIONS & NETWORKING

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7COM009B	RunPC/Network	279.
7COM0103	RunPC/Remote	139.
7COM0099	Software Bridge/Mac 2.0.1	99.
CE Software		
7CDM0101	QuickMail 2.5.1 (1-5 users)	249.
7CDM0100	QuickMail 2.5.1 (1 - 10 users)	375.
Dayna		
7NET0125	DaynaPORT E/Z	275.
7NET0076	DaynaPORT E/SE	179.
Ex Machina		
7CDM0111	Notify! 1.1 Personal Edition	109.
Farallon™ Computing		
7NET0210	EtherMac II/10T card Mac II	165.
7NET0211	EtherMac 30i/10T card SE/30	199.
7NET0212	EtherMac II Thinnest/card Mac II	165.
7NET0213	EtherMac 30i/10T card Mac IIs	299.
7NET0214	EtherMac 30i/Thinnest SE/30	199.
7NET0215	EtherMac 30i Thinnest card IIs	299.
7NET0007	PhoneNET® Plus, SE & II	31.
7NET0019	PhoneNET StarController®	879.
7NET0122	Timbuktu® 4.0	129.
7NET0034	Timbuktu/Remote® 3.0	129.
FreeSoft		
7COM0060	White Knight V 1.1	B5.

Insignia (Full line available)

7COM0107	Soft PC Universal 2.5	195.
Hayes		
7CDM0095	HayesConnect 3.0	89.
7COM0015	Smartcom II 3.3	84.
Synergy		
7COM0003	VersaTerm Pro 3.6	177.
7CDM0002	VersaTerm 4.6	90.
TechWorks		
7NET0133	GraceLAN 2.0 50-user	289.

DESKTOP PUBLISHING

Aldus		
7DTP0072	PageMaker 4.2	495.
7UPG0003	PageMaker 4.2 Upgrade	150.
7DTP0040	Personal Press 1.01	99.
Quark, Inc.		
7DTP0071	XPress 3.1	569.

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7DRI0517	Spectrum Series III Accelerator Card	449.
7Spectrum/BSi	or Series III	539.

EDUCATIONAL & ENTERTAINMENT

AmazeInc		
7ENT0400	The Far Side Computer Calendar	45.
Baseline		
7ENT0403	Talking Moose/Cartoon Carnival 4.0	23.
Broderbund		
7CDR0042	Just Grandma and Me-CD-RDM	39.
7GRA026B	Kid Pix 1.2	35.
	Where is Carmen Sandiego?	ea. 29.
7EDU0291	The Playroom-Color 2.0	29.
Centron Software, Inc.		
7ENT0329	BlackJack Strategy Tester/BlackJack Ace	65.
7ENT0384	Canis	25.
7ENT0277	Casino Master Standard Version	39.
7ENT0289	Casino Master Deluxe Color Version	45.
7ENT0383	PuzzleMaster	29.
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7Word Torture	Spanish, French, German, Russian	ea. 35.
MECC		
7ENT0381	The Dragon Trail	29.
7Number Munchers	or Word Munchers	ea. 29.
Nordic Software		
7EDU0276	Word Search Deluxe	35.
7EDU0142	Preschool Pack	35.
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7Picture III Level I	Spanish, German, French, Italian	ea. 42.
7VocabLearn Level I, II or III	French, German, Hebrew, Italian, Japanese, Russian or Spanish	ea. 35.
Personal Training Sys. (Full line Avail)		
7Macintosh, HyperCard, FileMaker Pro, Microsoft Excel, Microsoft Word, Aldus PageMaker 4.0, Aldus FreeHand, Aldus Persuasion, Quark XPress 3.0		ea. 59.
Software ToolWorks		
7MUS0092	Miracle Piano	399.
Sound Source		
7Star Trek Vol. 1 or II		SPECIAL ea.29.
Zondervan Publishing House		
7MacBible-Greek or NIV		ea. 79.
7BDK0021	MacBible - King James Version	79.
7BOK0033	MacBible NRS w/Apocrypha	79.

Fonts & Applications

Adobe Systems, Inc.		
7DAC0028	Adobe TypeAlign	62.
7FDN0264	Adobe Type Manager 2.03	59.
7FDN0351	Adobe Type On Call 2.0	59.
7FDN0295	Adobe Type Reunion	41.
Altisys		
7FON0014	Fontographer 3.5	265.
7FON02B4	Metamorphosis Pro 2.03	89.
Ares Software		
7FON0361	FontMonger	62.

GRAPHICS & MULTIMEDIA

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CAD0032	Design Your Own Home-Architecture	ea.65.
Adobe Systems, Inc.		
7GRA0304	Adobe Premiere	305.
7DTP0054	Illustrator 3.2 (w/ ATM 2.0)	369.
7GRA0125	Streamline 3.2	122.
7GRA0191	PhotoShop 2.0	549.
Aldus		
7GRA0092	Digital Darkroom 2.0	259.
7GRA0305	FreeHand 3.1	395.
7GRA0279	Gallery Effects Vol. I	129.
7GRA0131	Super 3D 2.5	325.
7HYPO027	SuperCard 1.6	195.
7GRA0112	SuperPaint 3.0	133.
Clarix		
7CAD0029	ClarixCAD 2.0	625.
7GRA0271	MacDraw Pro	275.
7UPG0004	MacDraw Pro Upgrade	99.
Deneba		
7GRA0280	Canvas 3	249.

Dream Maker		
7GRA0105	Cliptures Vol. 1 Business Images	69.
Graphsoft		
7CAD0024	Blueprint 2.1	219.
PC Globe		
7GRA0246	MacUSA	39.
Metro Image Base (Full line available)		
7GRA0277	Metro-ImageBasics	35.
Pixar		
7GRA0288	MacRenderMan & Showplace Bundle	619.
Ray Dream		
7GRA0292	Ray Dream Designer 2.0	589.
Softsync		
7GRA0318	ExpertColor Paint	29.
T/Maker		
7GRA0317	FaxMania, Business Fax Cover Sheets	29.
Thought I Could		
7GRA0302	Wallpaper	39.
Virtus		
7GRA027B	Virtus WalkThrough	309.

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INP0220	Thumbelina Mac	65.
Articulate Systems		
7INP0160	Voice Navigator II	599.
7INP0206	Voice Impact Pro	199.
7INP0207	Voice Impact	79.
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7INP0205	Typist Plus Graphics	475.
Canon		
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CoStar		
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7INP0194	Stringray Platinum	89.
Datadesk International		
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Kensington		
INP0060	Turbo Mouse ADB (SE or II)	109.
Key Tronic		
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Microtek		
7INP0180	Microtek ScanMaker 600ZS	1449.
Mouse Systems		
7INP0132	Little Mouse ADB	74.
7INP0163	A3 Mouse	85.
7INP0199	A3 Trackball	75.
Sharp (Full line available)		
CDMP023	Wizard Oz 8200 (128Kram)	399.
Sophisticated Circuits		
7ACC0535	Power Key w/Quickkeys Lite 2.0	75.
SuperMac		
MON0224	20" SuperMatch Color Display	1799.
ThunderWare		
INP0116	LightningScan 400	369.
INP01B9	LightningScan Pro 256	499.
Wacom		
7INP0179	Digitizing Tablet 6" x 9"	589.
UPGRADES & ACCELERATORS		
DayStar Digital		
7PowerCache 33 MHz		749.
7PowerCache 33 MHz w/B82		979.
7PowerCache 40 MHz		949.
7PowerCache 40 MHz w/B82		1199.
7PowerCache 50 MHz		1459.
7PowerCache 50 MHz w/B82		1799.
7DRI0224	FastCache IICI	269.
7DRI0421	FastCache IIsi	319.
7DRI0500	FastCache 040 for Quadra 700/900	379.
PowerUser®		
7CHP0066	2MB PowerBook 100/140/170 Upgrade	259.
7CHP0067	4MB PowerBook 140/170 Upgrade Kit	399.
7CHP006B	6MB PowerBook 140/170 Upgrade Kit	499.
MODEMS & FAX		
Dove		
7MOD0053	Dove Fax Plus w/ VDICE Mail	269.
Global Village		
7MDD0087	Powerport V. 32	499.

7MDD00B6	TelePort/Full FAX 2.0	
Hayes		
7MDD0065	Bundle 9600 ULTRA SmartModem	
PowerUser®		
7MDD0062	24/96 Mini Send/Receive Fax Modem	
7MDD0043	2400 Mini Modem	
7MDD0047	Mini Send Fax 2400/9600	
7MDD0071	9600 bps/V.32&V.42bis Modem	
7MDD0070	2400 bps/V.42bis Mini Modem	
Prometheus		
7MDD00B4	Home Office 24/96	
7MOD0085	Ultimate Home Office 24/96	

UTILITIES & PROGRAMMING

Abbott Systems, Inc.	
7UTI0236	Calc+
7UTI0113	CanOpener 2
Alsoft	
7UTI0269	Alsoft Power Utilities Bundle
Altisys	
UTI0224	EPS Exchange 2.0
Alysis	
7UTI0232	SuperDisk! 2.0
ASD Software, Inc.	
7UTI0135	FileGuard 2.7
7UTI0130	FileGuard 2.7 - Office Pack 5
7UTI0264	WindowWatch 1.52-Single
Baseline Publishing	
7UTI0187	Init Manager 1.1
7UTI0183	ScreenShot 1.2
Berkeley System Design	
7UTI0119	After Dark 2.0
7UTI0231	More After Dark/ After Dark 2.0 Bundle
Casa Blanca Works, Inc.	
7UTI0273	Drive 7
CE Software	
7UTI0188	Quickkeys 2 v2.1
7UTI0213	Tiles
Dantz	
7UTI0246	DiskIt Pro
7UTI0227	Retrospect 1.3
Insight Development	
7UTI009B	MacPrint 1.3
Kensington	
	PassProof
Salient	
7AutoDoubler	DiskDoubler 3.7
Symantec Corporation	
7UTI0151	Norton Utilities for the Mac 2.0
7UTI0214	Symantec Antivirus for Mac 3.0 (SAM)
7UTI0241	Symantec Utilities for Mac 2.1 (SUM)
7LNG0051	THINK C 5.0



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POWERUSER PRO 105 MB
DRI 0494 **\$599**

POWERUSER PRO 240 MB
DRI 0495 **\$999**

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ACC 0693 \$29

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POWERUSER PRO DAT (4MM)
Manufacturer's one-year warranty.
DRI 0502 **\$1799**

MED 0066: Extra 4mm Data Cartridge (60 Meter, 1.3 GB, Fuji) **\$15**

MED 0073: Extra 4mm Data Cartridge (90 Meter, 2.0 GB, Fuji) **\$19**

POWERUSER PRO PERSONAL TAPE DRIVE (160 MB)
Manufacturer's one-year warranty.
DRI 0503 **\$799**

MED 0072: Extra 160 MB Data Cartridge **\$29**

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POWERUSER 44 MB REMOVABLE
BND 0094 **\$579**

MED 0035: Extra 44 MB Removable Cartridge **\$75**

POWERUSER 88 MB REMOVABLE
BND 0095 **\$799**

MED 0071: Extra 88 MB Removable Cartridge **\$139**

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IT'S AN OLD STORY and a common one: your Mac doesn't seem to perform like it used to. Maybe you're using a new application whose operations take too long. Or maybe you have added a 24-bit display board or a large-screen monitor. Perhaps you have switched to System 7 and are using all the Finder options. Or you may want to take advantage of such System 7 functions as 32-bit addressing and virtual memory, but your Mac's logic board isn't designed to do so.

Any or all of these may lead you to consider trading in your current Mac for a faster one. One of the best and most popular ways to get a faster Mac without buying a new machine is to buy an accelerator board, a board that replaces your machine's processor and memory with faster versions.

Macworld Lab tested 28 accelerators for a range of Macs, from the Classic to the Quadra 700. (Accelerators that shipped after our testing deadline are listed in "Accelerator Details.") We did not test accelerators for the Mac Plus or earlier machines because it is more cost-effective to simply replace them with a faster Mac. You also get better

The latest

generation of

accelerators

The Need for Speed

components with a new Mac. But we found it makes sense for owners of most of the newer Macs to buy an accelerator board instead of a new machine or an Apple upgrade.

Most accelerators use either the Motorola 68030 processor found in the Mac IIx, IICx, IICi, IIsi, and IIfx, or the 68040 found in the Quadras. We did not test accelerators that are based on the 68000 processor used in earlier Macs. The 68000 doesn't support some of System 7's functions, and vendors are phasing out boards based on this processor. (We did test the 68000-based Harris Laboratories Classic Performer to show the kind of speedup such boards can provide to users who aren't interested in System 7 features.)

Whether to get a 68030-based or 68040-based accelerator is the toughest decision for most Mac owners. The 030 and 040 accelerators use different technologies to implement their functions. These differences may seem arcane at first, but they can actually be crucial for some applications.

68030 Technology

OWNERS OF A 68000-BASED SYSTEM WILL SEE MORE ADVANTAGES than just speedup by getting a 68030-based accelerator, since the 68030 processor has many more built-in capabilities than does a 68000. But owners of 68030-based Macs, too, should consider getting a 68030-based accelerator board with a faster processor.

Not all 68030 processors are the same. Some 68030-based accelerators (such as one version of the Mobius Technologies' One Page 030 Display) use Motorola's 68EC030 chip, which does not include a Paged Memory Management Unit (PMMU), a component required to run System 7's virtual memory. Vendors use the 68EC030 because it costs less than the full 68030, resulting in less expensive accelerators for consumers. Those who don't work with large files or lots of applications simultaneously may not need virtual memory.

Even if they use the full 030 processor, many accelerators do not support System 7's virtual memory, and require Connectix Corporation's Compact Virtual 3.0 to implement this feature. (This product does not work with modular Macs like the II and IIsi.) Com-

provide brisk

performance

and add life to

older machines

by Matthew Leeds



panies whose boards do support Apple System 7's virtual memory include DayStar Digital, Newer Technology, and Sigma Designs.

Owners of 68000-based Macs like the Classic and SE should note that Apple does not certify System 7's virtual memory to work with 68030-based accelerators installed in these older Macs, which were not designed for such memory. However, Compact Virtual 3.0 does work in many such environments. Several accelerator vendors bundle it with their accelerators (see "Accelerator Details").

The 68000 also does not support a floating-point unit (FPU) math processor; the 68030 supports the 68882 FPU, an improved and faster version of the 68881 used with the 68020. An FPU can dramatically speed up certain applications—such as spreadsheets, ray tracing, and rendering programs—that take advantage of an FPU's specialized calculation abilities. Accelerators using 68030 chips usually include a socket for an FPU. The FPU can operate at a different speed than the processor can, since each chip's speed is controlled independently. If you frequently use an application that uses floating-point math, you can improve that application's performance by getting an accelerator with a moderate processor speed, say 25MHz, and a fast FPU speed, say 33MHz—at a lower cost than buying a board with both the processor and FPU clocked at the higher speed, 33MHz. Companies that let you select the FPU speed include Mobius Technologies, MacProducts USA, and Novy Systems.

68040 Technology

THE 68040 PROCESSOR IS THE LATEST version of the 68000 family. It essentially combines the 68030 processor and 68882 FPU, adds larger instruction and data caches (which store frequently used commands and data to speed processing), and

speeds processing by improving the *pipelining* (how tasks are divided internally in the chip). These changes improve performance, but they also reveal compatibility problems with some software (see *Lab Notes*, this issue, and "The Quadra Quandary," *Macworld*, March 1992). When the 040 was introduced, for example, popular programs like Microsoft Excel and Aldus PageMaker were incompatible with it; software fixes to make them compatible are now available.

The data caches on the 68040 use a new mode of operation called *copy back*. On the 68030, commonly used data and instructions are stored in main memory and are always available. The copy-back mode of the 68040's data caches writes such instructions to main memory only when requested, saving time by not having the CPU write every instruction to memory. But not all applications handle this mode correctly, resulting in errors.

Accelerators that use the 68040 include software to turn off the copy-back mode so the 68040 will work with all applications. But this fix has a price: turning off the 68040's copy-back mode can slow the 040 down significantly. Macworld Lab tests show that having copy-back mode turned on can increase application speed by 200 to 450 percent, with math-oriented applications benefiting the most.

Some boards come with software to detect 040-incompatible programs and automatically switch to running with the 040's caches turned off, but this software does not reenable the 040's caches unless you quit the 040-incompatible application. This means that if you are running more than one application, the caches remain off even when you switch to 040-compatible applications. However, an INIT called Compatibility from Alysis Corporation corrects this problem.

The 68040 has a built-in FPU, so you do not need to buy one separately.

The built-in FPU is faster than the 68882 that works with the 030 processor. But to fit the FPU onto the 68040, Motorola removed some functions such as sine, cosine, and tangent (now supported via software). This means that the maximum FPU performance gains will be seen only when vendors start to develop 68040-specific applications,

most likely in the areas of CAD/CAM and rendering.

The 68040's PMMU is less flexible than the 68030's, making it more sensitive to how software manages memory. Although this should not affect applications, it requires vendors to rewrite their virtual memory applications. Apple does not guarantee that System 7's virtual memory will work with third-party accelerators. Unless you can purchase a compatible third-party virtual memory solution, you may be stuck doing without.

At press time, no such product was available for 040-based accelerators running under System 7, though the new Virtual 3.0 being developed by Connectix may solve the problem when released.

Some older display boards—including Apple's Mac II Video Card and early versions of its Macintosh Display Card 4•8 and 8•24—do not work on machines using the 68040 and require a change in the boards' ROM chips.

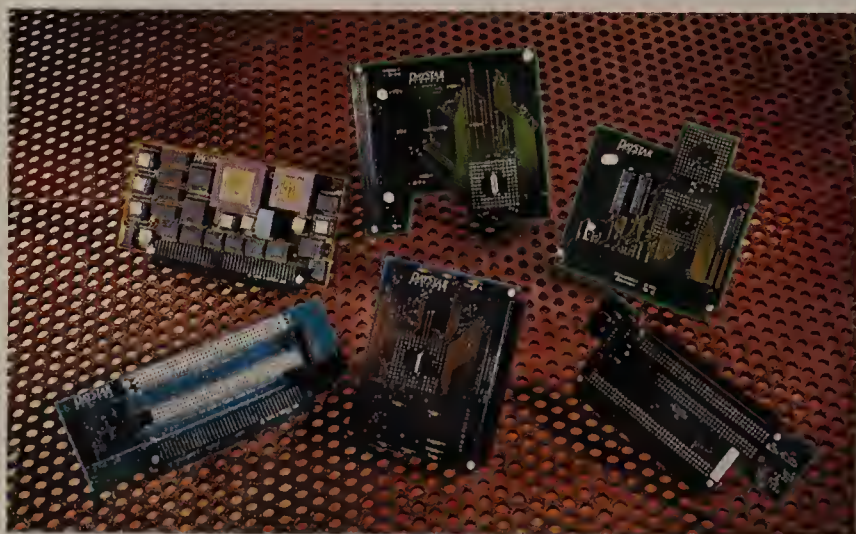
As with the 68030, there are lower-cost versions of the 68040: the 68LC040 and the 68ELC040. The 68LC040 has its FPU portion disabled; the 68ELC040 has both its FPU and PMMU portions disabled. Using these processors means vendors can offer lower prices, and the loss of the FPU makes sense for many users, since most applications do not use the FPU. The Radius Rocket 25i uses the 68LC040 with the FPU disabled. Likewise, the loss of the PMMU makes sense for many users who don't use virtual memory capabilities.

Until recently the 68040 was available only as a 25MHz chip, but 33MHz versions are now available in small quantities. Some accelerator manufacturers have been waiting for the 33MHz version before introducing a 68040-based accelerator board. Our tests show that this has been a wise move, since the fastest 68030 accelerators (which run at 50MHz) performed as well as the 68040 accelerators (which run at 25MHz), and they often cost \$1000 to \$1500 less. Impulse Technology and Radius have begun shipping 33MHz 040-based accelerators and Fusion Data Systems has announced one.

Memory Considerations

MACS BASED ON THE 68000 CAN USE only 4MB of system memory because 68000-based Macs can't take advantage of the 32-bit address mode in System 7. With 32-bit addressing, Macs based on the 68020, 030, and 040 processors can address up to 128MB of memory (the IIx is limited to 65MB, while the Quadra 900 can address 256MB).

For most Macs, the faster speeds of accelerators require faster RAM. The ac-



Rather than create a different board for each type of Mac Processor Direct Slot, DayStar Digital uses one common board (upper left) and offers adapters to connect it to each type of Mac PDS.

JEANNE STACK

Accelerator Performance

Times are in seconds.
Shorter bars are better.

Time taken by processor to perform tasks the accelerator could not handle.

Graphics

Four scroll tests—in Resolve, Excel, MacWrite II, and Word—represent overall graphics-handling performance, since scrolling is the Mac's most common graphics task.

FPU Math

Four tests—function evaluation in Mathematica, scientific simulation in Extend, and scientific recalculations in Excel and Resolve—show a floating-point-unit math processor's performance.

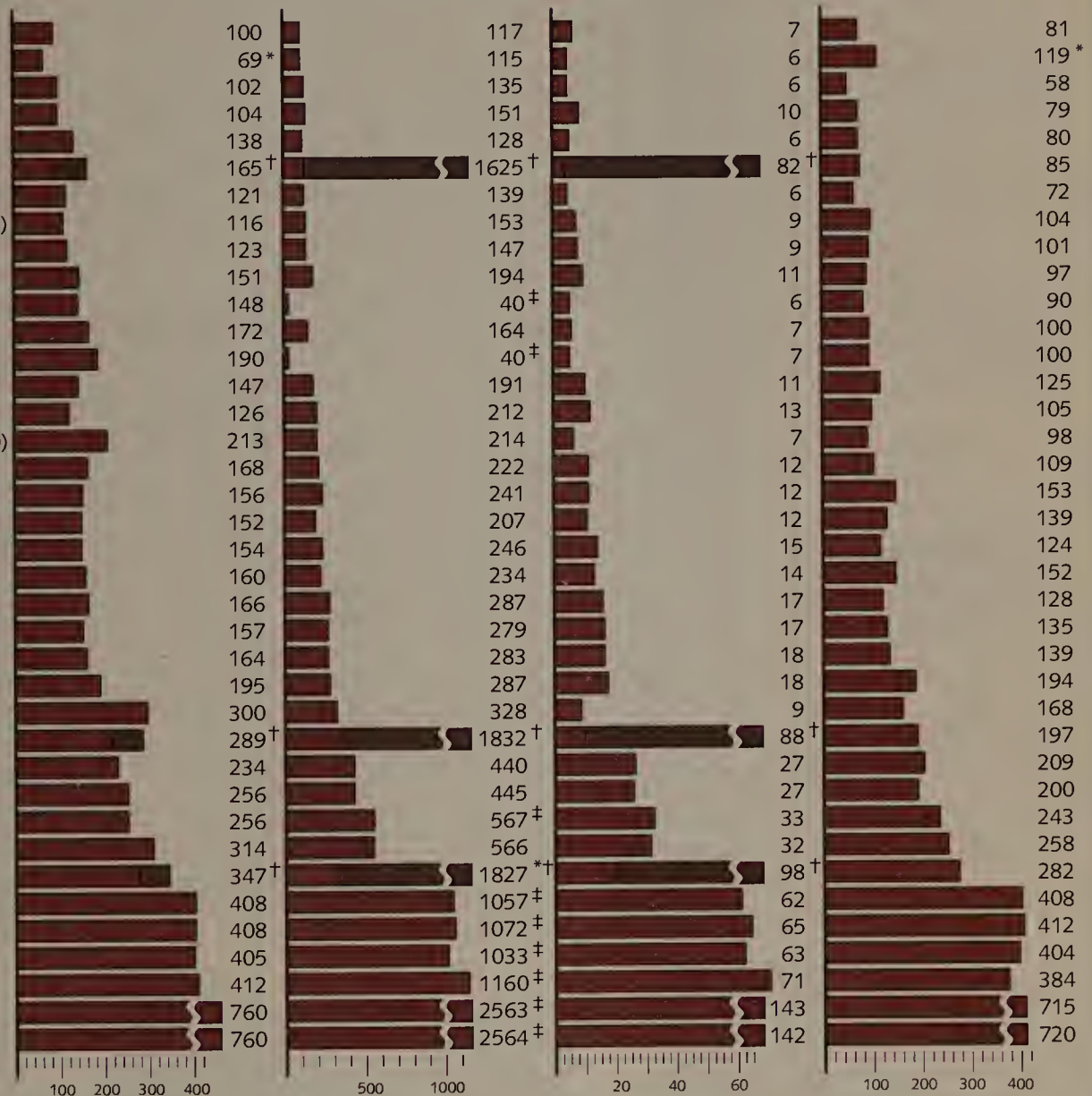
Non-FPU Math

Two tests—business recalculations in Excel and Resolve—show the performance of math functions by the processor and Standard Apple Numerics Environment math-handling routines.

Processor

Six tests—a FileMaker II sort, MacDraw Pro graphics flip, PageMaker font change, FreeHand preview, and replace in MacWrite II and Word—measure the speed of the processor by itself.

Newer Technology fx/Overdrive
Macintosh Quadra 900
Radius Rocket (II)
Applied Engineering TransWarp SE 40MHz
Fusion Data Systems TokaMac CI 25
Total Systems Gemini Ultra (SE), Classic
Radius Rocket (IIci)
DayStar 50MHz PowerCache (IIci, SE/30, IIsi, II)
Macintosh IIfx
DayStar 40MHz PowerCache (SE/30, IIci, II)
Impulse Performance/040 (IIfx)
Fusion Data Systems TokaMac 25 (IIsi)
Impulse Performance/040 (IIci, IIsi)
DayStar 40MHz PowerCache (IIsi)
Novy Systems Quik30 33MHz (SE)
Fusion Data Systems TokaMac SX 25 (SE/30)
DayStar 33MHz PowerCache (SE/30)
Sigma Designs Bullet 030 (IIci, IIsi)
DayStar 33MHz PowerCache (IIci, IIsi, II)
Applied Engineering TransWarp SE 25MHz
Macintosh IIci with cache card
Dove Computer MaraThon Racer 030 II (II)
Novy Systems Quik30 25MHz (SE)
Mobius One Page 030 Display (Classic, SE)
Macintosh IIci
Fusion Data Systems TokaMac LC 25
NewLife Accelerator (Classic, SE)
Novy Systems Quik30 16MHz (SE)
Macintosh SE/30
Macintosh IIsi
Macintosh II
Dove Computer MaraThon Racer 030 SE
Macintosh LC
Macintosh Classic II
Macintosh LC II
Harris Laboratories Classic Performer
Macintosh SE
Macintosh Classic



* Couldn't run Word 4. † Couldn't run Excel; patch now available. ‡ Couldn't run Mathematica.

Products are listed in order of fastest to slowest overall performance, based on results from 36 tests that measure all aspects of performance. Times are reported in total seconds for each set of tests. Several boards are relabeled versions of another company's board, and results were identical. Results for

the MacProducts USA RailGun boards are the same as for the Novy Systems Quik30, and the results for the Total Systems Magellan boards are the same as for the Fusion Data Systems TokaMacs. Boards appear twice if speeds on different Macs vary by more than 5 percent.

Top Five Performers by User Specialty

Times are in seconds.
Shorter bars are better.

Top five performers

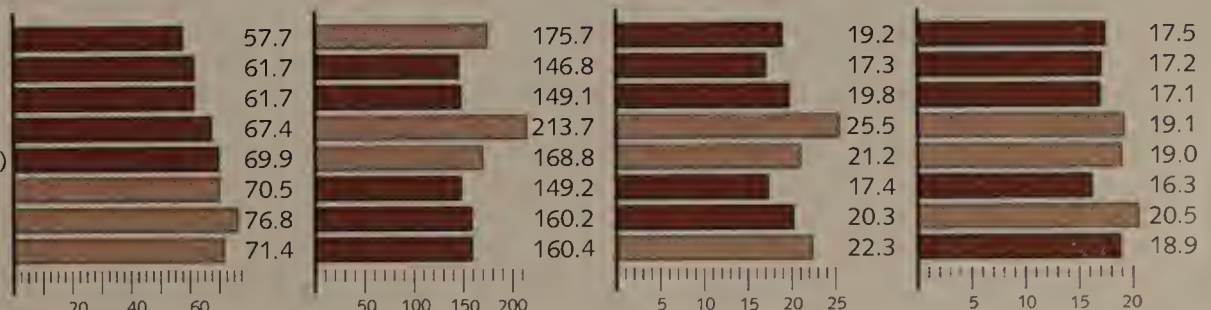
Infini-D render,
for CAD/CAM users

4-D sort,
for large database users

Think C compilation,
for developers and
programmers

Photoshop resample,
for image editors and
publishers

Radius Rocket (II)
Newer Technology fx/Overdrive
Fusion Data Systems TokaMac CI 25
Impulse Performance/040 (IIfx)
DayStar 50MHz PowerCache (IIci, SE/30, IIsi, II)
Macintosh Quadra 900
Macintosh IIfx
Fusion Data Systems TokaMac CI 25



ACCELERATOR DETAILS

Company	Product	Processor Speed (in MHz)/ Price (excluding RAM)	FPU Included	Macs Supported	Maximum on Board
68030-BASED BOARDS					
Applied Engineering	TransWarp LC	25/\$1199; 33/\$1499; 40/\$1990; 50/\$2195	●	LC	¹
	TransWarp SE	25/\$1189 ² ; 40/\$2195 ² ;	●	SE	4MB ³
DayStar Digital	PowerCache	33/\$998 ⁵ ; 40/\$1298 ⁵ ; 50/\$2299 ⁵	optional	SE/30, LC, II, IIx, IICx, IICi, IIsi	¹
Dove Computer Corporation	MaraThon Racer 030 II	32/\$1099	optional	II	¹
	MaraThon Racer 030 Classic	16/\$599	optional	Classic	¹
	MaraThon Racer 030 SE	16/\$599	optional	SE	¹
MacProducts USA	030 RailGun	16/\$399; 25/\$599; 33/\$849	optional	Plus, SE, Classic	64MB
Mobius Technologies	Mobius One Page 030 Display	25/\$1095	optional	SE, Classic	16MB
Newer Technology	fx/Overdrive	50/\$1995	●	IIfx	¹
	fx/Overdrive-II	50/\$850	○ ⁶	IIfx	¹
NewLife Computer Corporation	NewLife 25	25/\$689 (SE); 25/\$719 (Plus)	optional	Plus, SE	16MB
	NewLife 33 SE	33/\$1895	●	SE	4MB
	NewLife Accelerator Classic	16/\$599	●	Classic	16MB
	NewLife Accelerator SE	16/\$499	●	SE	16MB
Novy Systems	Quik30	16/\$495; 25/\$595; 33/\$795	● ⁷	Plus, SE, Classic	64MB
Sigma Designs	Bullet 030	50/\$1995	●	IICi, IIsi	¹
Total Systems	Gemini Classic	20/\$716; 33/\$903; 50/\$997	optional	Classic	64MB
	Gemini Ultra	20/\$716; 33/\$903; 50/\$997	optional	Plus, SE	64MB
	Mercury 030/SE	16/\$325	optional	Plus, SE	64MB
	Mercury Classic	16/\$495	optional	Classic	64MB
	Voyager 030	33/\$1032; 50/\$1435	● ⁸	II, IIx	¹
68040-BASED BOARDS					
Applied Engineering	TransWarp 040	25/\$2599	●	II, IIx, IICx, IIfx, IICi	128MB
Fusion Data Systems	TokaMac CI 25	25/\$2595	●	IICi	¹
	TokaMac LC 25	25/\$2495	●	LC	¹
	TokaMac SX 25	25/\$2595	●	SE/30, IIsi	¹
Impulse Technology	Performance/040	25/\$2195; 33/\$3295	●	II, IIx, IICx, IIfx, IICi, IIsi	129MB
Radius	Radius Rocket	25/\$1999	●	II, IIx, IICx, IICi	128MB ¹
	Rocket 25i	25/\$1499	○	II, IIx, IICx, IICi	128MB ¹
Total Systems	Magellan 040 CI	25/\$1397	optional	IICi	¹
	Magellan 040 LC	25/\$1187	optional	LC	¹
	Magellan 040 SI	25/\$1397	optional	SE/30, IIsi	¹

● = yes; ○ = no; AS = Apple's System 7; CV = Connectix's Compact Virtual 3.0. ¹ Uses system RAM. ² Also available with slower FPU. ³ Will support 16MB with pending software bundle. ⁴ Included. ⁵ Price includes \$49 for required adapter. No adapter required for IICi. ⁶ Speeds logic board's FPU if installed. ⁷ FPU is optional on 25MHz board. ⁸ Also available with faster FPU. ⁹ Supports virtual memory under System 6.0.X via Connectix's Virtual 2.03.

celerators' processors communicate faster than do the memory chips on the Mac's logic board. The mismatch in communication speed between these components results in either the memory chips missing data or the processor slowing down while waiting for the memory chips.

To get the same level of performance that Macworld Lab did for compact Macs like the SE and Classic, you may need to add new, faster memory chips for the accelerator board (see "Accelerator Performance"). You'll need 80ns or 70ns RAM in most cases.

If you use slow RAM, the accelerator must use *wait states*, which are pauses inserted in the processor's requests for data from the memory chips, to let the memory catch up to the processor. Macworld Lab tests show that each extra wait state can degrade an accelerator's performance by about 12 percent.

Boards for 68000-based Macs usually have slots for their own RAM, which they use instead of system RAM. In many cases, you can move the RAM already installed on your Mac to the accelerator's slots, but that RAM may not be fast enough to avoid extra wait states.

Some companies provide software that lets you leave the slower RAM on the logic board and use it as a RAM disk or RAM cache. (You'll still need to have RAM on the accelerator board to do this.)

The Dove Computer MaraThon Racer 030 Classic and the Harris Laboratories Classic Performer support only

static cache RAM, which acts as an intermediary between the memory chips and the processor. This limits your ability to expand total system RAM to what your logic board can handle.

Some accelerators, such as the Mobius, MacProducts, and Novy boards, provide the option of copying the contents of a Mac's ROM chips into the RAM on the accelerator board. This improves performance, since the processor can access the contents of RAM faster than it can the contents of ROM. Because they use only static cache RAM, the MaraThon Racer 030 Classic and the Classic Performer don't give you this option.

Connection Issues

IN CREATING AN ACCELERATOR BOARD, designers start with a 68030 or 68040 chip and then must weigh a variety of other elements to create a fast, functional, and affordable device.

On-Board Cache	Virtual Memory Supported	Enable/Disable Options	Warranty Period (in months)	Toll-Free Technical Support
●	none	cache, SANE	12	○
●	CV ⁴	cache, SANE	12	○
●	AS	cache, SANE	36	●
●	AS	cache, FPU	12	○
●	CV	FPU	12	○
●	CV	cache, FPU	12	○
○	CV	FPU	12	○
○	CV ⁴	board, video	12	●
○	AS	board, FPU	60	●
○	AS	board, FPU	60	●
○	CV ⁴	FPU	24	●
●	CV ⁴	FPU	24	●
○	CV ⁴	FPU	24	●
○	CV ⁴	FPU	24	●
○	CV ⁴	FPU	24	○
●	AS	cache	60	○
●	CV ⁴	board, cache	12	○
●	CV ⁴	board, cache	12	○
●	CV ⁴	board, cache	12	○
●	CV ⁴	board, cache	12	○
●	none	board, cache	12	○
○	none	board, cache	12	○
○	none	040 mode, board	12	○
○	none	040 mode, board	12	○
○	none	040 mode, board	12	○
○	none	040 mode, board	24	○
○	none	040 mode, board	12	○
○	none	040 mode, board	12	○
○	none ⁹	040 mode, board	12	○
○	none ⁹	040 mode, board	12	○
○	none ⁹	040 mode, board	12	○

The first consideration is where and how the accelerator attaches to its host. Some products, such as the MarATHon Racer 030 Classic and the Classic Performer, either replace or sit piggybacked on the original processor. Some accelerators clip to an existing chip—the only option for a Classic accelerator. Occasionally these clips come loose if the computer is moved, but they have the advantage of not requiring modifications to the logic board's components.

Another type of accelerator board replaces an existing processor by plugging into the processor's socket, but not all Macs have such a socket. To use such a board on a Mac with no processor socket—like most IIfx's—you need to have a socket added to the computer's logic board. To use a DayStar's Power-Cache accelerator in a IIfx requires this modification (DayStar will modify your logic board at no additional cost).

Most accelerators are NuBus or Processor Direct Slot (PDS) boards, which can easily be installed in an empty slot. The PDS is the only slot on the SE, SE/30, IIsi, LC, and LC II. The IIfx and Quadras have NuBus slots and PDS's.

An accelerator installed in a PDS can give greater performance than an accelerator in a NuBus slot. The PDS connects directly to the processor, so instructions and data move between the accelerator board and the processor with no delay. NuBus slots do not connect directly to the processor; instead, the logic board referees traffic between the processor and all the NuBus slots, a process that can delay communication between the accelerator and the processor if several NuBus boards are vying for the processor's attention. Because almost every Mac has a different PDS design, accelerator makers produce only one kind of board with adapters for each type of PDS.

Accelerators based on the 68040 chip may include their own PDS or custom expansion slot—this slot connects to the accelerator's processor, not the processor on the Mac's logic board. Examples include the Radius Rocket, Impulse Technology Performance/040, and Applied Engineering TransWarp (a relabeled version of the Impulse accelerator). These slots often provide direct access to the 68040 chip and can themselves support a display accelerator, high-speed SCSI board, or other expansion device. This is especially useful on one-slot Macs like the IIsi. But beware: because there is no standard for the design of these slots, you will probably have to get any such expansion devices directly from the manufacturer of your accelerator. (Some manufacturers of 030-based accelerators, including DayStar Digital and Sigma Designs, provide a PDS adapter that provides two PDS connections for the IIsi. The accelerator occupies one, leaving the other available for other boards.)

The Apple Upgrade Option

RATHER THAN BUY AN ACCELERATOR, you might consider a logic board upgrade from Apple. Upgrades are available for the SE (to an SE/30), the Mac II and IIfx (to a IIfx), the IIfx (to a IIsi), the Classic (to a Classic II), the IIfx and IIsi (to a Quadra 700), and soon the LC (to an LC II). A logic board upgrade gives you genuine Apple parts, with potentially fewer compatibility problems down the road. You might also find it easier to sell your system later, as not everyone is comfortable with modified systems.

In some cases, you gain new features beyond the speed increase. For example, with an upgrade from an SE to an SE/30, you get a new ROM that supports color; and with an upgrade from a IIfx to a IIfx, you get a faster SCSI bus.

Upgrading a Mac II or IIfx to a IIfx makes some sense. The performance increase is significant; you get hardware that a future version of the system software might take advantage of (for example, you would get the most recent SCSI chip, one that the forthcoming SCSI Manager will use to improve hard drive performance); and you can add an accelerator to your new IIfx later if you need more speed.

In some cases it may be cheaper to purchase a new Mac (remember, your old machine still has some resale value). Potential hidden costs to a logic board upgrade include buying additional or different-speed RAM, adding a SuperDrive, adding a better power supply, and paying a dealer to install the upgrade.

In all other cases, unless you've got a special consideration such as a PDS al-

MW**EDITORS' CHOICE****For the Classic**

Gemini Classic The 50MHz version of the Gemini board was the fastest, offering better performance than a IIx. **Company:** Total Systems. **List price:** \$997.

NewLife The 16MHz board offers better performance at a lower price than a Classic II upgrade. **Company:** NewLife Computer Corporation. **List price:** \$499.

For the SE

Gemini Ultra 50 Although edged out by the TransWarp SE board in our speed tests, the 50MHz Gemini Ultra 50's lower price makes it a better buy. **Company:** Total Systems. **List price:** \$997.

For the SE/30

PowerCache 40MHz This board brings performance up to Mac IIci levels. **Company:** DayStar Digital. **List price:** \$1299.

For the Mac II

Radius Rocket Fastest for processor-related processing, the 68040-equipped Rocket is attractively priced. **Company:** Radius. **List price:** \$1999.

For the IIxi

Magellan 040 SI
PowerCache 50MHz These two boards tied in performance and are close in price. **Company:** Magellan, Total Systems; PowerCache, DayStar Digital. **List price:** Magellan \$2097; PowerCache \$2299.

For the IIci

PowerCache 50MHz Although edged out in speed by the TokaMac CI 25, the PowerCache offers a better price. **Company:** DayStar Digital. **List price:** \$2299.

ready occupied or a company restriction against third-party products, we recommend adding an accelerator board rather than a logic board upgrade. You'll get better performance at the same price or much better performance at a slightly higher price—and for all machines, accelerators are available that exceed the performance gain you can get from just an upgrade.

Performance: Compact Macs

THE SE HAS MORE ACCELERATOR options than any other machine. This is mostly because of its age and the fact that it can benefit highly from acceleration. Adding an FPU can improve floating-point math by 25 times, according to Macworld Lab tests. An accelerator can

also remarkably improve hard drive and display performance—in fact, the fastest accelerated SE outperformed a stock IIci and in many tests either outperformed or kept up with a stock IIx, as "Accelerator Performance" shows.

The fastest SE board was the Applied Engineering TransWarp SE 40MHz. The Total Systems Gemini Ultra 50 was a close second, but it had some problems with Microsoft Excel that the TransWarp SE board did not. Excel was a problem for several 030-based boards, but each manufacturer was developing patches during our testing period; all should have them available by the time you read this. Impulse Technology recently announced a Classic accelerator.

Several of the accelerators look very similar, and in fact are the same. The Mobius and MacProducts boards are built by Novy Systems. These relabeled boards match the performance of the original manufacturers' versions, and they all offer the same options and software as the originals do. The only differences are the names on the packaging and the prices.

While you can speed up an SE by upgrading it to an SE/30, we recommend buying an accelerator board instead, since that will give you better performance.

Likewise, it makes more sense to accelerate a Classic than to upgrade to a Classic II. All the Classic accelerators we tested were faster than a Classic II—with the notable exception of the 68000-based Harris Laboratories Classic Performer, which we included to show differences between the older, 68000-based accelerators and the new crop of 68030-based boards. The fastest accelerator was the 50MHz Total Systems Gemini Classic, which ran faster than a stock IIx. Dove Computer has recently begun shipping accelerators for the Classic and Impulse Technology has announced such accelerators.

For SE/30 acceleration, DayStar's PowerCache, which plugs into the PDS slot, was a runaway winner in speed. The combination of a static RAM cache and a high-speed processor-FPU pair ensured performance gains on all tests. Not surprisingly, considering their design, DayStar's products did well on other Mac systems also.

Performance: Modular Macs

ONLY TWO ACCELERATORS SPECIFICALLY designed for the LC were available for testing, and one (the Total Systems Magellan 040 LC) was simply a relabeled version of the other (the Fusion Data Systems TokaMac LC 25). Because they are the same product, these 040-based 25MHz boards performed the same. DayStar's 030-based PowerCache accelerators

will also work with LCs, and Applied Engineering recently began shipping an 030-based LC accelerator, and Impulse Technology, which makes Applied Engineering's board, plans to ship its own version.

On modular Macs with NuBus slots (like the II, IIci, and IIxi), the 50MHz, 68030-based DayStar PowerCache boards and the 25MHz, 68040-based Radius Rocket traded off the lead on tests. The PowerCache performed better on disk-based tests, and the Rocket excelled on processor-based tests. The PowerCache's advantage in disk-based tests is mainly due to its large on-board static RAM cache. Fusion Data Systems' TokaMac 25 series and Total Systems' Magellan 040 series (which is a relabeled version of the TokaMac 25 series) closely trailed the PowerCache and Rocket. For IIci owners, Applied Engineering has announced a 50MHz, 68030-based accelerator.

The IIx used to be the fastest Mac available. Then the Quadras came along. But with Newer Technology's 50MHz fx/Overdrive accelerator installed, a IIx ran generally faster than a Quadra 900. Newer recently began shipping the fx/Overdrive-II, an upgrade that runs the IIx's own processor faster rather than requiring it to be replaced. The fx/Overdrive-II costs only \$850, compared with the original version's \$1995. Newer has also announced the Quadra Overdrive, which runs the normally 25MHz Quadras at 33MHz.

Installation Notes

MACWORLD LAB FOUND THE BOARDS easy to install, with two exceptions.

First, the NewLife Accelerator SE did not fit in an older SE (Apple changed the SE's case a few years ago to give it more room, and NewLife apparently did not design its board with the previous cases in mind; NewLife says upcoming versions of its boards will correct the problem).

Second, installing Newer Technology's fx/Overdrive (but not the fx/Overdrive-II) requires removing the IIx's processor and FPU chips. Although Newer supplies a chip puller, you run the risk of damaging these chips, making them unusable if you need to reinstall them later.

In both cases, let an experienced dealer install the boards.

Making a Choice

WHILE PERFORMANCE AND PRICE command the most attention in evaluating accelerators, there are other areas to consider: ease of installation, warranty, compatibility, cost of peripherals, bundled software, and expected longevity of the technology used. All the accelerator ven-

dors offer tech support via bulletin boards or online services except for Dove, Newer, and NewLife.

Owners of Mac II-series computers will no doubt be eyeing the 040-based accelerators, since they use the newest technology. Although an 040 may have more cachet, Macworld Lab tests show that a 50MHz 030-based accelerator is generally as fast as an 040-based accelerator. For some users, an 030-based board is a better option because of incompatibilities some applications have with 040-based Macs (see *Lab Notes*, this issue).

Price is another issue: the higher cost of an 040 accelerator coupled with the cost of upgrading to 040-compatible versions of your software may be too high.

But the 030-based accelerators will not be able to keep up with newly released 33MHz 040s. And incompatibility problems should disappear as vendors upgrade their software.

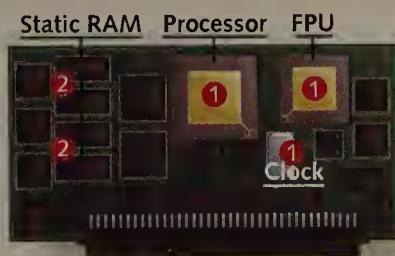
However, compatibility questions should not be ignored. Not all vendors rigorously test a wide range of applications to ensure that their accelerators—whether based on an 030 or 040—are compatible with them. During our testing period, several vendors shipped us software upgrades to fix incompatibilities they had not detected before shipping their product. That means some dealers may sell a version of the board with the earlier software, which will require the user to encounter the bug, call technical support, and find out about the needed software upgrade. The company with the most incompatibilities was Impulse Technology, which shipped us three upgrades in a two-week period to fix incompatibilities with programs like MacDraw Pro. Impulse's accelerator also had several problems with ACIUS's 4th Dimension caused by the 68040's new cache modes. However, other 040-based accelerators did not have these problems or their makers had already detected and fixed them.

Before spending a couple thousand dollars on an accelerator, consider how much improvement you need. Adding a cache card instead of an accelerator to a IIci or IIsi can improve the speed of some applications (like Excel) by 25 percent, according to Macworld Lab tests; general improvement ranges from 15 to 30 percent. Cache card prices start around \$125.

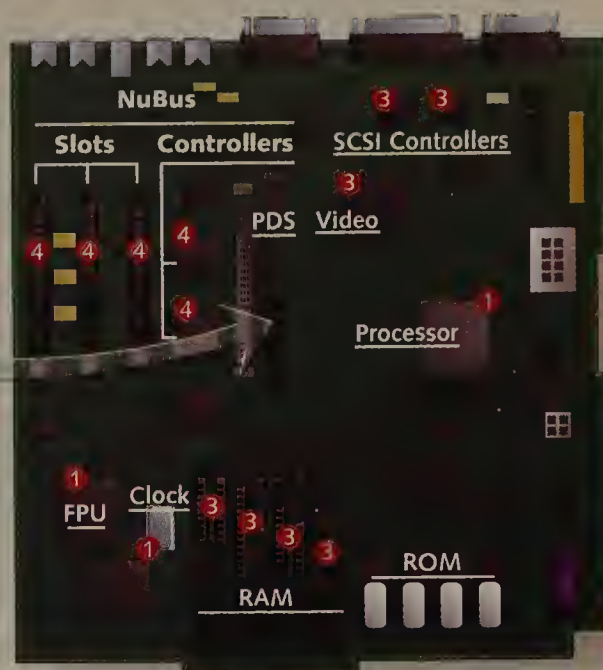
A cache card works like a RAM cache, except that it is faster because the cache card uses static RAM chips. The static RAM is fast enough to keep up with the processor, eliminating the wait states that are normally inserted to keep the processor and memory in sync. Cache cards come in different memory sizes, but you'll see about the same performance gain no

What Can Accelerators Do?

Accelerator (DayStar PowerCache)



Logic Board (Mac IIci)



An accelerator is an add-in board that speeds up a Mac and that can even add new features. The accelerator changes how a Mac works by bypassing some logic-board components in favor of its own and enhancing the performance of others. (Some logic-board components remain unchanged even with the accelerator in place.)

Options for Modular Macs

The DayStar Digital PowerCache (shown here with a Mac IIci logic board) is typical of accelerators for modular Macs; it plugs into the Mac's Processor Direct Slot. Some accelerators plug into NuBus slots.

1 Replace components. All accelerators replace the Mac's processor and its clock with a faster set. This processor substitution accounts for most of an accelerator's benefits. Many accelerators also replace the floating-point-unit (FPU) math processor; some offer an FPU replacement as an option.

2 Add components. Some accelerators, like the PowerCache, add a static-RAM cache, which acts as a buffer between the accelerator's processor and the logic board's memory. This speeds up RAM by making the commonly used data more accessible. Accelerators that don't offer a static-RAM cache usually use their own faster RAM, instead of the logic board's RAM.

3 Enhance components. An accelerator does not directly affect the SCSI controller and the built-in video circuitry (for Macs that have it), but the accelerator does speed the software that controls those components.

4 Leave components unaffected. Accelerators don't speed the NuBus slots and their controller; these can become a bottleneck for some tasks.

Options for Compact Macs

Many accelerators for compact Macs, such as the SE, offer an option to copy the contents of the Apple ROM into the RAM on the accelerator. (Most accelerators for compact Macs use their own RAM instead of the logic board's.) This speeds up performance because a processor can access RAM faster than ROM. Another option typically found on accelerators for compact Macs is virtual-memory support, usually through third-party software.

matter what the size, since you quickly reach a point of diminishing returns.

Adding an FPU makes a big difference in the performance of applications that use floating-point arithmetic (as do some spreadsheet calculations, some ray-tracing and rendering tasks, and most CAD/CAM programs). For more standard math-oriented applications like simple spreadsheets, a SANE (Standard Apple Numerics Environment) trap is more effective. A SANE trap intercepts common mathematical calculations—from simple addition to complex trigonometric and logarithmic functions—built into the Apple ROM and substitutes less-precise but faster calculations. (In almost all cases, the very small changes in accuracy will go unnoticed.) Apple has included its own SANE traps, called Omega SANE, in System 7.0.1. But neither an

FPU nor a SANE trap will speed all your operations. If you find all your applications are sluggish, you'll want a more comprehensive solution like getting an accelerator or a faster Mac.

The final thing to consider when deciding how to speed your Mac is whether you are making a long-term investment or just trying to get your current machine through one more year. Remember, next year a new crop of accelerators (and Macs) will hit the street. **m**

See *Where to Buy* under "Accelerators" for contact information.

MATTHEW LEEDS works for a major software developer as its technical services manager.

Macworld Lab testing supervised by MARK HURLOW, with assistance from JIM FEELEY.

OF THE MANY INNOVATIONS POPULARIZED BY THE MACINTOSH, NONE HAS BECOME MORE INTIMATELY ASSOCIATED WITH THE MAC THAN THE MOUSE. THOUGH MICE HAD BEEN INVENTED NEARLY 20 YEARS EARLIER, THE MAC BROUGHT THE MOUSE INTO MAINSTREAM COMPUTING FOR THE FIRST TIME. AS *MACWORLD*'S JANUARY 1984 PREMIER ISSUE NOTED, "THE MOUSE MAY NOT BE THE ULTIMATE DEVICE FOR INTERFACING WITH COMPUTERS, BUT FOR THE TIME BEING IT'S THE BEST SYSTEM YET

devised for making computers more compatible with the people who use them."

Now, more than 8 years, 20 Macintosh models, and numerous system software revisions later, Macintosh users face a bewildering spectrum of pointing-device choices. Despite the wide range of options, most users settle for the Apple mouse that comes with the Mac. Are users shortchanging themselves by not considering other pointing devices? To answer that question, I spent several months living and working with more than 25 products from Apple and third-party vendors. The results may surprise you.

Sorting through Claims

STANDING OUT IN A CROWDED marketplace is never easy, so vendors make a variety of claims to convince users that a particular mouse, trackball, or other pointing device is better than the rest of the input-device pack.

For example, manufacturers often claim that their product is more comfort-

able to hold and manipulate. While differences among input devices have historically tended to be cosmetic, there is growing evidence suggesting that properly designed products are truly easier and safer to use.

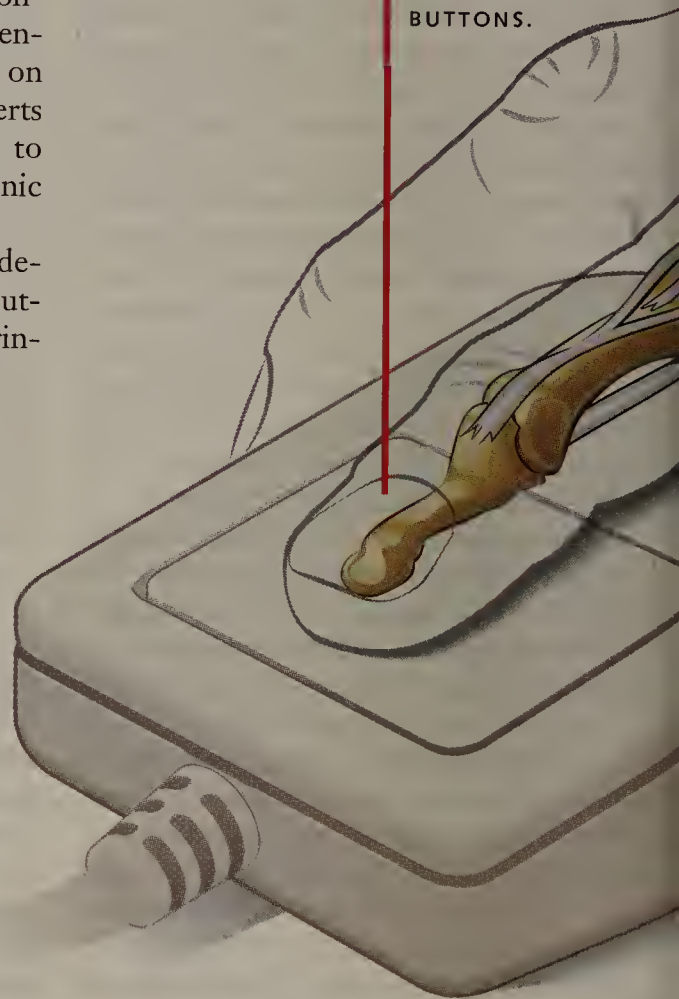
Mechanical input devices like keyboards, mice, and trackballs force users to make repetitive, small movements that can take their toll over time and cause *repetitive strain injuries* (RSIs). Also known as cumulative trauma disorders, RSIs are exacerbated by unnatural applications of force and awkward body positions. Lack of rest or recovery time is another important contributing factor. But while concerns over RSIs are increasing, the scientific literature is far from unanimous on the subject of RSIs. Some medical experts contend that there is little evidence to support the relationship between chronic motion and injury.

Still, responding to the desire for devices that minimize the risk of RSI, input-device manufacturers say they are begin-

ning to apply the science of *ergonomics*, the discipline devoted to the study of people interacting with their working environment. Altruistic motivations aside, vendors have discovered that claims of ergonomic design make good ad copy. Also, the trend toward legislative regulation of computers in the workplace at the federal, state, and municipal levels has spurred research in the relationship between input devices and RSIs.

Of the many factors contributing to RSIs, a product's design is most directly related to muscle tension. Minimizing muscle tension goes a long way toward making an input device less tiring to use. Ideally, the device should fit the cupped

FINGERS
SHOULD EXERT
MINIMAL
TENSION WHEN
HOLDING MOUSE
OR PUSHING
BUTTONS.



by Franklin N. Tessler

Illustration by
ARNE HURTY

I n p u t

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How—and why—to choose a better pointing device

shape of the user's hand, not the other way around. The forearm, wrist, and hand shouldn't be forced into awkward positions, and the fingers should rest comfortably and naturally on the buttons.

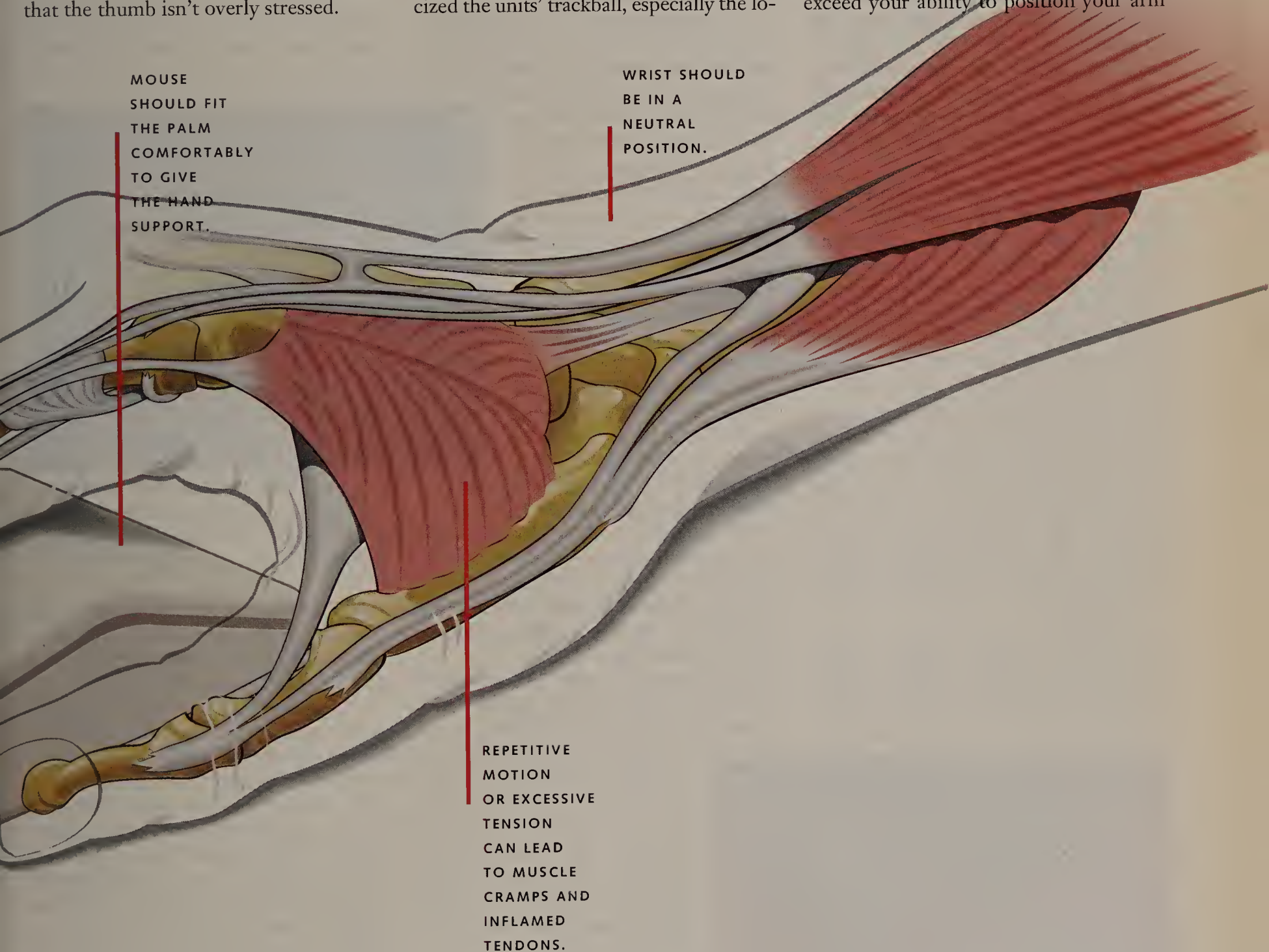
In trackball design, the thumb's role is an especially important consideration. Most trackballs are designed to be controlled by the index finger, but some rely on the thumb. While the thumb is well suited for side-to-side grasping actions, some experts maintain that the thumb's limited freedom of movement makes it a poor choice for controlling up-and-down or circular motions. Button-pressing is a good compromise movement, provided that the thumb isn't overly stressed.

Although some companies maintain that their input devices have a better ergonomic design and are easier to use, those I contacted declined to discuss the results of the research underlying their claims, citing the competitive pressures of a crowded marketplace.

And even with technical resources like Apple's, there is no guarantee of ergonomic success. For example, just a few weeks with a PowerBook made me thankful for the built-in ADB port that let me use a mouse or pen instead of the built-in trackball. Despite Apple's claims that the PowerBooks are ergonomically designed, some users have sharply criticized the units' trackball, especially the lo-

cation of the buttons and the central position of the ball. (This layout does have its fans.)

Another thorny issue is *resolution*, loosely defined as the precision with which the input device controls the cursor's motion. Rolling devices like mice and trackballs work by generating mechanical pulses, or *counts*, as they move. The Macintosh uses a device's software driver to translate counts into cursor motion. The more counts generated per inch of mouse movement or trackball rotation, the higher the resolution. While low resolution can lead to erratic cursor placement, increasing resolution can eventually exceed your ability to position your arm



t i v e s

or hand accurately. Most devices generate 75 to 150 counts per inch.

Resolution claims should be taken with a grain of salt because some vendors misleadingly advertise translated counts, not raw counts, as their device's resolution. A device that produces 200 counts to

celeration controls work pretty much the same, with none standing out.

A final consideration in choosing a pointing device is the amount of desk space needed. Mice typically require at least 6 square inches for comfortable operation, and most mouse pads are much

1987, Apple had improved its earlier design by giving the case a tapered profile front and back, making the mouse more comfortable to grasp. Logitech's MouseMan for the Macintosh, released in late 1990, took another step forward by sloping the mouse to one side to accom-

An ideal pointing device should allow both ultrafine positioning and the ability to jump across large areas quickly

the inch may, for example, simply multiply that raw count by 4 and transmit 800 counts to the Mac. But the extra counts provide no finer control because the device itself still differentiates only 200 counts per inch. To further complicate matters, vendors sometimes describe resolution in terms of dots of cursor displacement per inch (dpi) of device movement, a meaningless number unless you know the resolution of the monitor.

Ideally, a pointing device should permit ultrafine control for precision work but also let the user move the cursor quickly over a wide area when necessary, an important consideration on large monitors. Most products provide this flexibility through a feature called *variable acceleration*, or *ballistics*. When you move the pointing device slowly, the cursor follows at the same speed; when you move your hand rapidly, the driver causes the cursor to travel even faster than the device, so it takes less time to traverse the screen. Despite some vendor claims to the contrary, my testing revealed that, for routine work, the default responsiveness of products differed only slightly for each type of device.

Responsiveness is most critical in tasks like CAD and graphics editing. Consequently, many vendors let users customize cursor responsiveness through control panel software. The various vendors' ac-

larger than that. Trackballs are smaller than mouse pads but occupy about the same amount of space that most people use to move a mouse.

Optical mice, which use a sensing system with no moving parts, impose special restrictions. Although inherently more reliable than their mechanical counterparts, optical mice like the A³ Mouse from Mouse Systems Corporation need a special pad that incorporates a fine grid the mouse uses to sense direction of movement. If you rotate the pad slightly, horizontal motion of the mouse results in unwanted diagonal cursor movement on the screen.

I found that grading input devices is a lot like auditioning stereo equipment: audio experts can generate a slew of technical specifications for a particular loudspeaker, but in the long run, it's how the speaker sounds that really counts. With mice, trackballs, and other input devices, all the testing and measurements in the world can't substitute for real-life use.

To evaluate the products, I enlisted the help of several Macintosh users, including both novices and experts. Their impressions were supplemented by the opinions of several editors at *Macworld*. Users were asked to consider a number of characteristics—including appearance, construction and durability, ease of learning and setup, and functionality—in day-to-day work.

Selecting the Right Mouse

IN CHOOSING A MOUSE, THE shape is even more important than internal construction. The boxy contour of the original Macintosh mouse made it tiring to hold for extended periods. By the time the Apple Desktop Bus Mouse debuted in

modate the palms of right-handed users. Most of the testers appreciated the contoured design.

Unfortunately, a contoured mouse for right-handed users leaves left-handed users—who make up about 8 percent of the general population and between 10



Most mice have a similar design, although their feel differs significantly. Examples are (from left) Advanced Gravis SuperMouse, Mouse Systems A³ Mouse, Apple Desktop Bus Mouse, Logitech MouseMan, and Softcode SICOS Fancy Mouse.



Trackball designs vary widely, as these four devices show (clockwise from upper left): CoStar Stingray, Curtis MVP Mouse, Logitech TrackMan, and Kensington Turbo Mouse ADB.

and 15 percent of computer users—out in the cold. Logitech may offer a contoured version for them in the future, as it does now in its version for DOS PCs.

Of all the features that distinguish Apple's mice from its competitors', none has been so sacrosanct as its single button, an approach long used as an argument in favor of the Mac's ease of use. But times are changing, and three of the seven mice I tested sport multiple buttons. In most cases, button operation can be configured via a control panel—for example, you can define any button to click-lock, eliminating the strain of holding it down for extended dragging operations; or to double-click, minimizing the rapid finger action users have to repeat so often. Some mice go even further by letting you assign keystrokes to buttons.

Unfortunately, of the multiple-button mice I tested, only the Advanced Gravis SuperMouse makes it easy to distinguish among the buttons by touch so that you're less likely to push the wrong button acci-



JEANNE STACK

Designed as a mainstream alternative, the Altra Felix (upper left) is an exception to the niche orientation of other alternative devices such as (lower left to right) the Appoint MousePenMac, Appoint Thumbelina, and Advanced Gravis MouseStick.

dentally. Buttons would benefit from a feature like the raised bars or dots on a keyboard's D and K keys (or the F and J keys on some keyboards) that help touch-typists identify their finger position without looking.

Trackballs: Squeezing into Tight Spaces

DESPITE THE OBVIOUS, IF superficial, similarity to upside-down mice, trackballs trace their lineage to the 1950s. Because they were sturdy and could be built into existing consoles, trackballs were often used in military hardware. Trackballs were later adapted for use in video games and computers.

Trackballs' limited clearance requirements make them ideal for setups where space is at a premium. Apple recognized this advantage and built trackballs into the Macintosh Portable and PowerBook computers. But Apple has never offered a stand-alone trackball, claiming that the market is sufficiently saturated by third-party products.

Compared with mice, trackballs come in a dizzying assortment of shapes and sizes. For this article, I looked at 11 trackballs, ranging from MicroSpeed's tiny MicroTrac at the low end to EMac's imposing Silhouette Trackball.

The perfect trackball would be mounted with the top of the device's housing flush with the work surface. Unfortunately, unless you're willing to cut a recess into your furniture, using a trackball demands that you elevate your forearm, wrist, or hand. Although some manufacturers try to incorporate a natural wrist rest into the casing, their success varies. Of the trackballs tested, the Curtis MVP Mouse, with its sloping, embossed case, is my favorite. The EMac Silhouette, although nicely contoured and striking in appearance, is a bit too high for my comfort. The design of the Turbo Mouse ADB trackball from Kensington Micro-ware also pleased some editors.

Input on Keyboards

When buying a computer, most users give no more thought to the keyboard than to the pointing device, even though the keyboard is the part they have the most contact with. But a good keyboard can add comfort and efficiency to a well-thought-out work space. Ideally, the fingers should rest on the keys with arms parallel to the ground; the wrists should be relaxed, not flexed.

Things have come a long way since the days of Apple's original keyboard. Alternatives offer innovation with an eye toward user comfort. Available for most Mac models—the 128K, 512K, Plus, SE, SE/30, and Mac II family—many feature adjustable keyboard tilt angles to give fingers a boost reaching the third row of keys or the function keys, use dual-tone key shading to break up the visual monotony, and sport dual-legend function keys for split Mac-DOS PC use. Here's a sampler.

- Mac-101E, \$195, Prometheus Products. Features include switchable control and caps-lock keys; lock for the period and comma keys; removable function-key template; and a clear, hard plastic cover with a three-year warranty. Buyers also get a discounted price (\$49.95) on Quic-Keys². I particularly liked the defi-

nite click you get when pressing keys, which is a great boon for audio-feedback typists.

- MacPro Plus, \$179, Key Tronic. Similar to the Mac-101E, the MacPro Plus has switchable control and caps-lock keys and a lock for the period and comma keys, and is backed by a three-year warranty. With a \$15 kit, you can customize key resistance and tension so the keys will respond exactly as you like them to. Buyers can get the Tempo II macro software and an RJ-11 cable (for use with the Mac 128K, 512K, and Plus models) at no cost. Although its click is less audible than the Mac-101E's, the MacPro Plus's customizable tactileness makes it a top pick. (See *Reviews, Macworld*, September 1991.)

- TrakPro, \$249, Key Tronic. Essentially like the MacPro Plus with a built-in trackball and a System 7-compatible control panel device to assign keyboard commands to the trackball keys, the TrakPro needs Key Tronic's \$19.95 cable kit to work on Mac 128K, 512K, or Plus. Covered by a lifetime warranty. Our test units froze on several Macs under System 7. We did get them to work under System 6.0.7, but performance was inconsistent. When used on an SE, the TrakPro had fairly

smooth trackball action, but on an SE/30, cursor movement became hopelessly erratic. Key Tronic said it is working on resolving quality problems with the trackball module's manufacturer.

- Switchboard, \$239.95, Prometheus Products. Designed for the multiplatform office, Switchboard also works with IBM PS/2 and standard DOS PCs via DIP-switch settings; all necessary cabling is included. It has separate modules for the text, numeric, and cursor key units so you can rearrange them to suit handedness and other layout preferences. An optional trackball (\$149) and vertical function keypads (\$49) are also available. The Switchboard comes with a three-year warranty. (See *Reviews*, February 1991.)

- Apple Keyboard II, \$129. The standard keyboard for use with the Mac 128K, 512K, and Plus has an nonadjustable keyboard tilt, monochrome coloring, no function keys, no cursor or numeric keypads, and with its Mac-only key labeling, no recognition that anyone might use a non-Mac PC. It comes with a one-year warranty.

- Apple Extended Keyboard II, \$229. This extended keyboard for Macs with ADB ports has the same monochrome coloring and

permanent tilt as the regular Apple keyboard, but it adds function keys and numeric and cursor keypads. It has a one-year warranty.

Several alternatives to the standard typewriter keyboard have been designed, and their designers say they are working on Mac versions. They include

- Tony, Tony Hodges. Use it like a standard keyboard or crack it in half and rotate it like a drawbridge (see *Conspicuous Consumer, Macworld*, August 1991).

- Datahand, Industrial Innovations. A unique marriage of familiar typewriter key layout with radical, split keyboard hand rests. Instead of keystrokes, you move your fingers left, right, down, curled in, and flexed out—sort of like typewriter shorthand. This approach is meant to increase speed and accuracy of data entry while decreasing the risk of repetitive-motion stress to the hands and fingers (see *Conspicuous Consumer*, August 1991).

- The Bat, Infogrip. Another two-fisted data entry product, The Bat relies on chording (pressing several keys at once) to input data, much like a court reporter's machine. Infogrip touts The Bat's enhanced speed, reduced repetitive strain, and easy input for disabled users.—SUZANNE COURTEAU

Apart from overall size, trackballs differ most in the ball's diameter, mass, and position. From an ergonomics standpoint, the ball is the most important moving part because it controls the cursor. Ideally, the ball should be equally capable of slow, fine motion and rapid, coarse motion.

square inches (a slightly smaller area than typical for mouse users). The light touch makes zipping the cursor around the screen almost too effortless, although you can map handle motion to apply to a small segment of the display for precision work. But it's hard to control at the edge of the

aliens, a joystick is ill suited to more mundane tasks like word processing.

Two other input devices also deserve special mention: the AirMouse Remote Control and Appoint's Thumbelina are both designed for presentations. The AirMouse is a cordless mouse that commu-

Although mice and trackballs are excellent pointing devices, they fall short for drawing and painting tasks

While easier to control, a larger ball may be too massive to move effortlessly. Only the Silhouette gives the user a measure of control over the ball's mass—the product comes with four balls, each a different mass and color, that you can pop in and out to suit your taste.

The ball's location also determines which fingers will generally be used to move it. In most designs—where the ball is centered in the housing—the index and middle fingers are the most natural to use. A symmetrical layout is preferable if the trackball will be used by both right- and left-handed people. Most trackballs are designed this way. But the Silhouette's design is more suited to right-handed use, and the Logitech TrackMan for the Macintosh is designed for use only by right-handed people.

Button placement is another important concern in selecting a trackball. Buttons should be within easy reach. You don't usually move the ball with the thumb, which means the thumb is a good choice for activating the main button, as on the Silhouette. The large, contoured buttons on the CoStar Stingray serve as ideal thumb rests for both right- and left-handed users. Because it's awkward to move the ball while pushing the button, a drag button is another essential trackball feature. Trackball button functions can be configured by control panels.

Kraft Systems, with its Trackball ADB, and Curtis, with the MVP Mouse, also offer foot switches to supplement buttons on the main units. Although I found it tiring to rest my foot on either company's pedal for long stretches, foot controls can be a welcome addition for some disabled users.

Alternative Pointing Devices

POINTING DEVICES THAT DEFY CLASSIFICATION are a testament to their inventors' ingenuity. Altra's Felix, for example, is a squat box about 6 inches on a side. In the center is a small plastic handle, which you grasp with your thumb and index finger, topped by a switch that works like a standard mouse button. The handle moves freely within an operating area of about 2

operating area, which can make pull-down menu selections difficult. Most users disliked the Felix's feel or control, but one loved it.

A unique feature called Window Manager lets you map the corners of the Felix's operating area to specific areas in the active window. For example, moving the handle along the left edge to the top-left corner automatically moves the cursor to the close box. Unfortunately, cursor motion tends to be jumpy, especially when you try to reach the extreme corners of the screen.

The MousePenMac, from Appoint, is another unusual mouse replacement. A cross between a pen and a mouse, it's designed to be used on soft surfaces such as fabric. (Slick mouse pads don't provide enough friction for this device.) Although I found the MousePenMac awkward for desktop use, it was great when used with a PowerBook notebook computer away from a desk. Sitting on a park bench with the PowerBook perched on my lap, I found the MousePenMac was often easier to use than the built-in trackball. As with the Felix and other unconventional pointing devices, you either love the MousePenMac or you hate it.

The Advanced Gravis MouseStick was the only joystick I received to test for this article. It performed well with arcade games and Microsoft Flight Simulator, although having to use a separate controller box was inconvenient. But a joystick makes a poor general-purpose input device. While it may be great for zapping

communicates with a base unit (and the Mac) by infrared light. The AirMouse works well from across a room, as long as the Mac's display is large enough that you can see what you're doing. If you can't afford AirMouse's \$595 price, Appoint's \$99 handheld Thumbelina is fine for stand-up work at short range.

Drawing Tablets: Electronic Paper

ALTHOUGH MICE AND TRACKBALLS are excellent pointing devices, they fall short for drawing and painting tasks, an area where digitizing tablets excel. Tablets cost much more than other input devices and can take up much desktop real estate. Fortunately, most manufacturers have versions as small as 6 inches by 9 inches. Still, if you factor in extra space for power supplies and outboard processor boxes needed by tablets like Wacom's, you might end up making a trip to a furniture store for a bigger desk.

A drawing tablet is designed to facilitate the actions of an artist or drafts-person. Most use a mouselike device (called a puck) or pen that is moved across the drawing surface, causing the cursor to follow on the screen. Getting used to a tablet takes a bit of practice, especially if you're used to a mouse. When you lift a mouse off the work surface and move it, the cursor stays put—with tablets, the cursor jumps to a new position. Two tablets—those from Summagraphics Corporation and Kurta Corporation—offer a mouse-emulation mode, but these emulations do not work when in drawing mode.

Some tablets, like Wacom's, can detect the amount of pressure being applied on the pen. Compatible Macintosh software can use this information to simulate the effect of a pen or brush on paper.

As a nonartist, I appreciated the ability to use the pens to trace drawings and photographs. I especially liked the segment of the Personal Writer PW10SL tablet devoted to mimicking mouse and keyboard operations. For example, a virtual keyboard at the tablets' top left lets you enter text without using the keyboard.

Once you get used to one, a pen-based tablet can be more natural to use

MW

EDITORS' CHOICE

MouseMan for the Macintosh The contoured shape is an ideal fit for right-handed users. A good choice for first-time buyers or as a replacement mouse.
Company: Logitech. **List price:** \$129.

Gravis SuperMouse Our second choice comfortably fits the hands of most people—including, unlike the MouseMan, left-handed users. **Company:** Advanced Gravis. **List price:** \$129.95.

than a mouse. Several *Macworld* editors find that tablets produce less stress on their hands than do mice.

The Power of Speech

HAND-OPERATED POINTING DEVICES that directly steer the cursor are ideal for graphical user interfaces like the Mac's, but what about situations where hands-on control is inconvenient or impossible?

One approach to hands-free operation is voice control, a longtime staple of science fiction. Although true speech recognition is still years away, Articulate Systems' Voice Navigator II and MacSema's Voice Express bring limited voice control to the Macintosh. Both products let you associate brief voice commands with actions like key presses and menu selections by digitizing your voice and comparing it with recorded patterns. You train both devices by repeating three times the phrase you are associating with each action; because neither product truly understands speech, you can use almost any

sound, as long as you're consistent. (You can have a lot of fun with this if you're inventive.) Still, neither product claims to replace a keyboard and pointing device.

The Pick of the Pointers

ALTHOUGH IT'S POSSIBLE TO ARGUE in favor of mice, trackballs, or other alternatives, experience with real Macintosh users has convinced me that choosing a pointing device is still largely a matter of personal preference. In fact, despite what some vendors claim, published research hasn't come up with a clear-cut winner, either—there is research that lauds and criticizes each type of device.

Among the mice, the Logitech MouseMan, with its contoured design, was a clear winner among our testers, with the Advanced Gravis SuperMouse (also made by Logitech) coming in second.

There was less consensus for the trackballs. I prefer the Curtis MVP Mouse and the EMac Silhouette, despite its low housing. Other testers also liked Micro-

Speed's full-size MacTrac trackball.

While most users give little or no thought to choosing an input device, a poor decision—or no decision at all—can make using the Mac difficult, if not downright unhealthy. Fortunately, you don't have to be an expert in product design to apply ergonomics principles to your selection. Like buying a pair of shoes, finding a pointing device that works for you demands a critical eye and a generous helping of common sense. And just as you wouldn't walk out of the shoe store without a fitting, don't consider a mouse, trackball, or other alternative without a trial or money-back guarantee. You use them day in, day out, so don't settle for just any pointing device. **m**

See *Where to Buy* under "Input Devices" for contact information.

A *Macworld* contributing editor, FRANKLIN N. TESSLER is an M.D. who uses a variety of hand-held devices as a radiologist specializing in ultrasound.

EVALUATING INPUT DEVICES

Company	Product	List Price	Comments
MICE			
Advanced Gravis	Gravis SuperMouse	\$129.95	Better-contoured than the Apple mouse. Multiple buttons. Our second-favorite mouse.
AirMouse Remote Controls	AirMouse Remote Control	\$595.00	Cordless infrared mouse. Good for stand-up presentations.
Apple Computer	Apple Desktop Bus Mouse	\$99.00	Sharp angles on side make it harder to hold than contoured mice.
Logitech	MouseMan for the Macintosh	\$129.00	Multiple buttons. Excellent feel. Contoured to fit right-handed users. Our overall favorite mouse.
Mouse Systems Corporation	A ³ Mouse	\$149.95	Multiple buttons. Special optical pad can cause tracking problems.
	Little Mouse ADB	\$134.95	Too narrow for most users' hands. Special optical pad can cause tracking problems.
Softcode Canada	SICOS Fancy Mouse	\$89.00	Flatter shape than the Apple mouse. Hard to grip.
TRACKBALLS			
Asher Engineering	Lynx Trackball	\$99.00	Buttons can be hard to press. Overall flimsy feel.
CH Products	RollerMouse	\$119.95	Comfortable casing. Large ball's weight requires extra effort.
CoStar Corporation	Stingray	\$129.00	Low-profile case with large, contoured buttons.
Curtis Manufacturing	MVP Mouse	\$149.95	Contoured case with wrist rest. Foot switch optional.
EMac	Silhouette Trackball	\$99.95	Includes four replaceable balls with different weights, so you can choose most comfortable one. Positioned higher than other trackballs.
Kensington Microware	Turbo Mouse ADB	\$169.95	Excellent ball feel. Buttons easy to reach and press.
Kraft Systems	Trackball ADB	\$119.95	Middle button hard to reach. Includes foot switch.
Logitech	TrackMan for the Macintosh	\$149.00	Designed only for right-handed users. Ball controlled by thumb, which can be awkward.
MicroSpeed	MacTrac	\$119.00	Tapered design. Comfortable hand position. Ball is a bit heavy.
	MicroTrac	\$89.95	Smallest trackball. Can be attached to side of keyboard or portable.
Mouse Systems Corporation	A ³ Trackball	\$139.95	Wrist rest. Large buttons are easy to reach but can be hard to press.
DRAWING TABLETS*			
CalComp	DrawingBoard II	\$495.00	Pressure-sensitive stylus available. Beta version evaluated was responsive. Cordless version \$645.
Kurta Corporation	IS/ADB	\$495.00	Easiest tablet to set up.
Personal Writer	PW10SL	\$799.00	Includes special drawing area with a virtual keyboard.
Summagraphics Corporation	SummaSketch II ADB	\$699.00	Mapping tablet to screen is difficult. Too many cables.
Wacom Technology Corporation	Wacom SD-421E	\$1095.00	Pressure-sensitive stylus available. Easy to set up.
	Wacom SD-510C	\$695.00	9-by-6-inch drawing area. Pressure-sensitive stylus available. Requires separate controller box (included). Easy to set up.
ALTERNATIVE DEVICES			
Advanced Gravis	Gravis MouseStick	\$99.95	Joystick. Uses separate controller box (included). Not appropriate for day-to-day tasks.
Altra	Felix	\$129.00	Finger-operated. Cursor can be difficult to control.
Appoint	MousePenMac	\$99.00	Penlike device. Can be used on most surfaces. Works well with portables.
	Thumbelina	\$99.00	Hand-held, thumb-operated trackball. Good for stand-up presentations.

* 12 by 12 inches unless noted otherwise. Tablets are available in larger sizes for dedicated uses like CAD.

all-in-one prog

Six integrated programs

that give you

a lot of power

for a small investment



ILLUSTRATIONS BY GORDON STUDER

rams

INTEGRATED SOFTWARE PROVIDES A wide variety of functions in a low-cost, compact package. Typically, an integrated package includes several different applications organized in cooperative modules: a word processor, a spreadsheet with charting capabilities, a database, a graphics program, and telecommunications software. Integrated programs are ideally suited to people on a budget and those who are running less-powerful Macs. Big jobs are best handled by dedicated software packages; none of the current crop of integrated programs are well suited to writing a book, maintaining a huge mailing list, or creating a complete set of complex financial projections. For people whose needs are more general, however, integrated programs can be a good value.

I evaluate six integrated software packages: Microsoft Corporation's Microsoft Works 2.0, Claris Corporation's ClarisWorks 1.0, Symantec Corporation's GreatWorks 2.0, MacVonk USA's HandiWorks 1.0, Zedcor's Desk 3.07, and Beagle Bros' BeagleWorks 1.0. For a quick look at how these packages compare, see "Integrated Overview."

In order to simulate how these programs are used in real-life situations, I invented Privacy Advocates of America (PAA), a small nonprofit organization working for personal privacy rights on the national and state level. In addition to standard business correspondence, PAA needs to keep a database of contributors, to whom the organization sends mail-merged letters. PAA also produces a graphically embellished newsletter of its activities, *Privacy News*, and sends it to members and news organizations. To track financial contributions, the organization uses a spreadsheet. And finally, PAA's executive director uses telecommunications software to log on to online services to do legal research.

The integrated packages I looked at use one of three methods to integrate their separate application modules. The simplest method, used by Microsoft Works and Desk, creates separate documents for each type of work (word processing, spreadsheet, and so on) and uses the standard Mac Clipboard to copy and paste information between modules.

The integration method used by ClarisWorks and HandiWorks lets you create compound documents by opening *frames*, areas in a document where you can do work from each of the modules. If you are writing a report and need to insert a table with a few calculations, you draw a spreadsheet frame right in your word processing document. When you click in the spreadsheet frame, the menu bar changes to reflect the spreadsheet functions. Clicking in the text brings you back to the word processor, and the menu bar changes back to word processing commands.

The newest path to integration is followed by BeagleWorks and GreatWorks. These programs use System 7's publish and subscribe capabilities to actively link information in one document to the same information in another document. This is similar to copying and pasting information, except that when you change the information in a publisher document, the corresponding information in the subscriber document changes automatically. In BeagleWorks, publish and subscribe is called In-Context editing, and the linking is mostly transparent; as with a frame-based system, when you click in the spreadsheet area of the word processing document, the menus change to spreadsheet mode and you can make changes. When you are done, you return to the word processor. But the publish-and-subscribe method of linking files differs from the frame-based method in that each kind of document (word processing, spreadsheet, and so on) exists as a separate document on the hard drive. GreatWorks uses the standard version of publish and subscribe, which requires you to open the publisher document and make your changes there; when you save changes, the subscriber document is updated.

When I sat down and tried to send a mail-merged letter, create a database, design a newsletter, maintain a simple chart of accounts, create a graphic, or go online, the packages' strengths and weaknesses became clear. Here's what I found.

B Y T O M N E G R I N O

Word Processing Tasks

MOST PEOPLE USE INTEGRATED PROGRAMS to do writing more than any other activity. All the programs I evaluated have



adequate word processors, covering basic features like WYSIWYG editing, font and style control, tabs, justification, margins, and headers. All the programs have spelling checkers; BeagleWorks, ClarisWorks,

and GreatWorks also provide a thesaurus.

There are a few differentiating features, though. BeagleWorks can automatically wrap text around irregularly shaped graphics and lets you change column structure anywhere on the page. The program also has custom character and paragraph styles, a word-count feature, and multiple columns. And BeagleWorks' tool palette gives you access to most of the basic features without your having to resort to the menus.

GreatWorks provides custom character styles, a print preview, multiple columns, and a draw layer. GreatWorks also

has a terrific envelope-printing feature. ClarisWorks' word processor is reminiscent of a stripped-down MacWrite II. It has multiple columns and autonumbered footnotes but is otherwise quite simple. HandiWorks is the only program that comes with a Spanish dictionary, and 17 other language dictionaries are available. The program also does automatic hyphenation and kerning. DeskWrite's remarkable features include a word counter and the ability to change text case (for example from small letters to all capitals) and add graphic borders around paragraphs. Microsoft Works brings up the rear in the word processing department. It has virtually no features beyond the basics.

■ For word processing I'd recommend BeagleWorks.

Creating Form Letters

MAIL MERGE LETS YOU CREATE PERSONALIZED form letters by melding a list of names (and other individualized items) from a database with a letter written in a word processor. To make the merge letter, I pasted the PAA logo into the header of a word processing document. In merge letters, field names from the database are placed into the document, usually in double angle brackets, like this: «Address». After you've written the letter and placed the merge field names where you want them, you tell the program to merge these fields from the database with the text of the letter. The program then adds the information you've specified from the database into the letter.

ClarisWorks, BeagleWorks, and GreatWorks all let you select from a dialog box the field names that you want to use, leaving a minimum of typing for you to do (see "Easy Mail Merge"). Mail merge in any of these programs is simple, but with ClarisWorks it's slightly easier than with the other programs. BeagleWorks has a feature that I like: the database can have up to 32 data layouts, with an associated selection criterion. So, if you set up a layout to select only certain records (say, all contributors who gave more than \$5000 last year), you can choose that layout in the mail merge, and print letters only for the select few.

Desk's DeskWrite and DeskFile work together for mail merge using much the same procedures as ClarisWorks and GreatWorks, but you have to type the brackets and field names into the merge letter manually, instead of selecting them from a dialog box.

Microsoft Works doesn't use bracketed fields in the merge letter; instead, you select a menu choice called Prepare To Merge. You're then presented with a list

of database fields to choose from. The annoying thing about this process is that you have to select Prepare To Merge for each merge field in your letter.

HandiWorks does not have a full-featured database module; instead, it has an address-book-like desk accessory called Address Manager. Address Manager has standard name and address fields, plus two user-customizable fields. Entering data into Address Manager is straightforward, but when you create a merge letter in HandiWorks, you must create spreadsheet frames for the Address Manager fields. The spreadsheet frames need to contain an equation that references the Address Manager fields, and the Address Manager fields cannot even be referenced by name, only by the number of the field. So, instead of typing in «Address», you type an equation in the spreadsheet frame that reads AMMailmerge (8). I found this needlessly difficult to master.

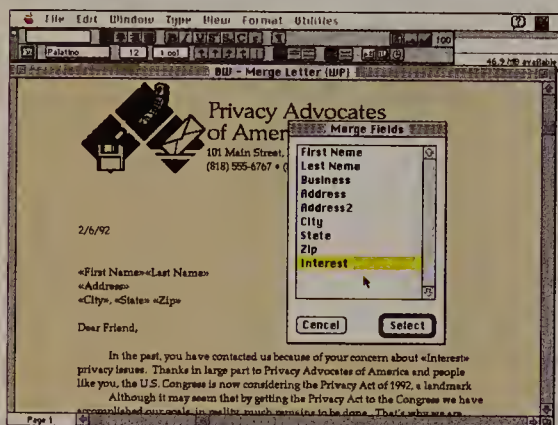
■ For the best mail-merge program, it is a close tie between ClarisWorks, BeagleWorks, and GreatWorks, in that order.



Laying Out the Newsletter

I CREATED THE FRONT PAGE OF *Privacy Advocates of America's* newsletter in each of the integrated programs (see "Newsletter Layout"). The newsletter is in a two-column format, with the *Privacy News* logo centered at the top. I drew the two horizontal rules using the graphics tools in each package, and the cartoon at the bottom of the page is a MacPaint-format graphic from a clip art collection.

Creating the newsletter in ClarisWorks was a breeze. Starting in the draw mode, I created the two text columns and linked them. I wrote the text, letting it flow between the two linked columns, then adjusted the height of the columns until I had the specific text I wanted in each column. I pasted in the *Privacy News* logo and the cartoon from the Scrapbook, dragging them directly to where I wanted them on the page. The headline and the masthead were each separate text blocks dragged into place. The "Inside This Issue" table of contents was another text block, and I drew the box around it with the rectangle tool. I then used the straight-line tool to make the two horizontal rules for the masthead. Finally, I wrote the text that went into the cartoon balloon and nudged it into place with the arrow keys on the keyboard.



Easy Mail Merge When creating mail merge fields in BeagleWorks, you simply pick the fields that you want to insert from a dialog box and double-click; the merge field then appears in your document with the double angle brackets already in place.

MEMORY APPETITES

Product	RAM Space ¹	Drive Space ²
BeagleWorks	1024K	940K
ClarisWorks	900K	562K
Desk (Total)	4881K	920K
DeskCalc	1000K	263K
DeskCom	20K	30K
DeskDraw	384K	265K
DeskFile	1024K	146K
DeskPaint	1953K	113K
DeskWrite	500K	103K
GreatWorks	1024K	588K
HandiWorks	750K	616K
Microsoft Works	768K	591K

¹ Suggested RAM in Get Info box.

² Program only, exclusive of dictionaries, translators, and so on.

Privacy News

Jan-Feb 1992 The Newsletter of Privacy Advocates of America Page 1

Congress Considers Privacy Act

The United States House of Representatives began debate in late January on the Privacy Act of 1992, a landmark piece of legislation that, if passed in its current form, will significantly expand citizen protection from intrusive government and corporate actions. The Privacy Act enumerates, at the federal level, a specific right to privacy. While many state constitutions specify a right to privacy, the United States Constitution has no such explicit provision. Over the past several decades, various Supreme Court decisions have derived a right to personal privacy from several of the Amendments to the Constitution. However, as the Court has shifted to the right during the past eight years, proponents of privacy rights have seen a series of decisions chipping away at the underpinnings of these derived rights. This legislation could have far-reaching effects, from the highly contested arena of abortion rights, to possible new limitations on police agencies nationwide, and will affect the right of consumers to remove their names from corporate mailing lists.

The main sponsor of the Privacy Act is California Senator Robert Fetsy (D). Asked what chances the bill has for passage, Senator Fetsy remarked, "We

Inside This Issue

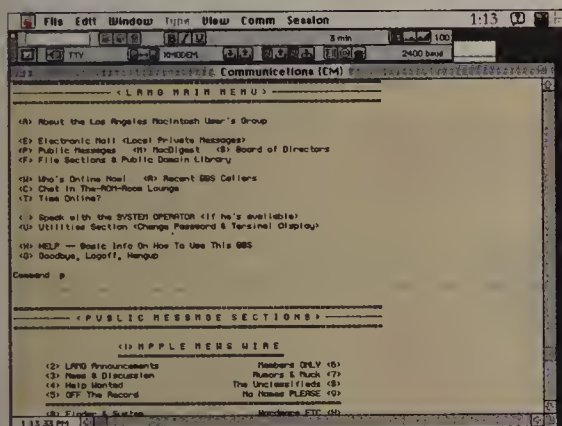
Congress Considers Privacy Act	Page 1
CA Bulletin Board System Seized	Page 2
Betty Pattergale Honored for Years of Service to Privacy Community	Page 3
Letters From Our Readers	Page 4

The main sponsor of the Privacy Act is California Senator Robert Fetsy (D). Asked what chances the bill has for passage, Senator Fetsy remarked, "We have some strong opposition, especially from the business groups and the anti-abortion organizations. We're not sure whether we'll be able to get the bill past such a powerful coalition of opponents in this session, especially in an election year. But if we do fall this time around, I will reintroduce the bill next year."

(cont'd on page 3)

Don't forget to write your Congressman urging passage of the Privacy Act!

Newsletter Layout This document contains many of the common formatting elements used to create simple newsletters. Notice the PICT logo, horizontal lines, MacPaint cartoon, dual columns, and the boxed paragraph used for the table of contents.



Getting Connected The BeagleWorks tool palette gives valuable information about the status of the telecommunications session in progress. The session has been going on for three minutes, the connection is at 2400 baud, the terminal emulation is TTY, and the currently selected file-transfer protocol is Xmodem. The other icons in the palette are to control file transfer, text capture, the Phone Book, dialing, and hanging up the phone.

Making newsletters in HandiWorks was almost as pleasant—because the program is completely frame-based, it is especially well suited to page-layout tasks. I simply drew frames, specified their type (text or picture), linked the text frames, pasted in the graphics from the Scrapbook, and added the extra text and graphic elements. HandiWorks has features normally found in more expensive, specialized programs, such as kerning, automatic hyphenation (in 17 languages), and good leading controls. A drawback to HandiWorks is that it has a sparse user interface that isn't as clear as that of some of the



other programs. The program's tool palettes use some peculiar icons that require explanation, and learning to deal with HandiWorks' frame-based document structure takes a while.

Creating the newsletter in GreatWorks was quite different. I put the *Privacy News* logo and the cartoon into separate draw and paint documents, respectively, then linked them, using publish and subscribe, with the newsletter, created in the draw module. I wanted to use the write module for the newsletter because it has better text controls, but it doesn't let you flow text around graphics, so I had to use the draw module to accomplish that layout task. And you can't link text columns in the draw module; you have to cut and paste to move text between columns as you are laying out the page. If you're going to be doing a newsletter regularly, GreatWorks isn't a great choice.

BeagleWorks gave me a different series of problems. I linked the newsletter elements from several documents in the word processor. BeagleWorks lets text flow around graphics, so I placed the cartoon and table of contents, and the text repositioned itself. While BeagleWorks lets you mix different column structures on a page, it always balances the text evenly between multiple columns—if you have a two-column layout, BeagleWorks tries to make both columns the same height. In the *Privacy News* page, I wanted to have more text in the left column than in the right column; BeagleWorks took the text and made two even columns. To make the text flow correctly, I had to create the table of contents box as a draw graphic, then precisely position it in the second column until the text flowed the way I wanted it to.

Desk is the wrong package to use to create a newsletter. While I was able to create *Privacy News* in DeskDraw, it was a laborious process. There's no provision for creating and linking text columns. Each element must be pasted into the layout, then dragged into place. This is a job only for the patient.

Microsoft Works required me to create the whole newsletter in the draw mode of the word processor because you can't create columns in the word processing mode. And text created in the draw mode doesn't use tabs, so it was difficult to get the table of contents to format correctly. All the text was created with the draw mode's text tool and dragged into place. There was no way to link the two text columns, so I had to do a lot of tweaking of column heights to place the text properly. And

Future Watch

The integrated software wars won't end with the products evaluated here. Two newer entries are expected to enter the fray by the time you read this.

Symantec plans to offer Q&A for the Macintosh, based on its best-selling package for DOS. Q&A is a flat-file database with an integrated word processor. The database portion is expected to be similar to Claris's FileMaker Pro, with the word processor much like MacWrite II. Users of the Q&A database will be able to share data over a network with DOS Q&A users. The word processor serves as a convenient way to do mail merges without switching to another program. Symantec hadn't set pricing for Q&A for the Mac at press time.

Microsoft will deliver the long-awaited Microsoft Works 3.0 by late spring, according to Microsoft spokespersons. Microsoft showed me a beta version of the program in March, and while some features were expected to change, Works 3.0 now includes a separate draw module and more draw tools. The word processor has revamped the dictionary and thesaurus functions, and the communications module has gained Kermit file transfers. The database module shows the most improvement; you can now have multiple layouts, and the draw tools are available to the database form designer. Microsoft Works 3.0 follows the same path to integration as does its predecessor: cut and paste; publish and subscribe is not supported.

Microsoft will be using DataViz's file translators in Works 3.0; this gives Works extensive file interchange options with dozens of other programs in both the Mac and DOS worlds. Microsoft Works 3.0 is expected to sell for the same \$249 price as the current version.

text that needs to be moved from one column to the next must be cut and pasted. This resulted in a newsletter that took too much effort to create.

■ For newsletter layout I'd pick ClarisWorks, with HandiWorks as a close second.

Telecommunications

TELECOMMUNICATIONS IS THE WEAKEST module in each of the packages, with the exception of HandiWorks, which lacks such a module altogether. I used

each of the other packages to log on to CompuServe, and I signed on to a local bulletin board system at both 2400 baud and 9600 baud and downloaded a file using the Xmodem protocol (a standard way to communicate between computers). While each of the programs works adequately, their lack of scripting and other tools designed to make routine communication easier make the process harder than it needs to be.

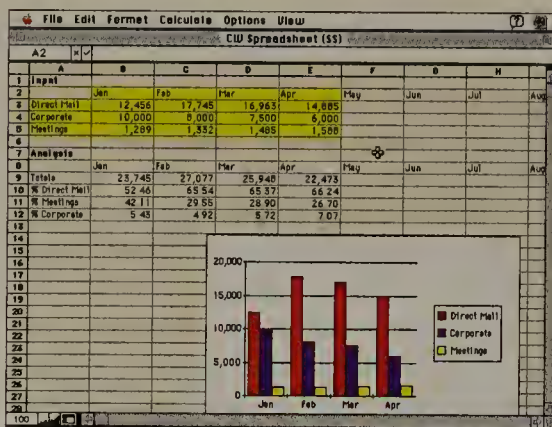
If you spend a lot of time using your modem, you are probably best served by buying a separate telecommunications program such as FreeSoft's White Knight

or Software Venture's MicroPhone II. These programs feature scripting—which lets you automate log-on sequences and online actions—and can handle a variety of file-transfer protocols, such as Xmodem, Zmodem, and

Kermit, that ensure that files transferred between two modems are sent error-free.

Zedcor's DeskCom is a simple desk accessory that handles connection, text capture to a file, basic Xmodem file transfers, and not much else. Microsoft Works adds VT102 emulation for those who need to communicate with mainframes, but it doesn't really add anything else to the basic features list. Both DeskCom and Microsoft Works let you save up to eight phone numbers in a communications document, so you don't have to retype frequently called numbers.

ClarisWorks, BeagleWorks, and GreatWorks build their communications modules around Apple's Communications



Year-to-Date Charting To create a chart in ClarisWorks, all you need to do is select the range of cells that you want to chart, then pick Make Chart from the Options menu. ClarisWorks places the chart right into the spreadsheet, and can resize the chart as needed.

Toolbox, a set of software tools that is built into System 7 and can be installed on machines running System 6. The ClarisWorks and GreatWorks communications modules are almost identical. They are functional but sparse.

The best communications module is offered by BeagleWorks (see "Getting Connected"). Instead of saving each online service you call as a separate communications document, as do ClarisWorks and GreatWorks, BeagleWorks saves a Phone Book file in the System Folder. Each entry in the Phone Book file can have a set of parameters that include speed, terminal emulation, and other communications settings. Best of all, you can associate a simple log-on script with each Phone Book entry; BeagleWorks gives you four script commands—Wait For (text), Send (text), Password, and Pause—that let you handle most log-on sequences. After you create the script

with the script editor, choosing the Phone Book entry and clicking on the Dial button calls the online service and logs you on automatically.

■ For telecommunications I would choose BeagleWorks.

Spreadsheets

PAA'S SPREADSHEET NEEDS AREN'T complex; it uses spreadsheets to track contributions and do some simple financial projections. Although in the past the organization tried using a spreadsheet for day-to-day accounting, it found that an off-the-shelf personal finance package was better suited to its accounting needs.

At the end of each month, PAA's director takes the total amount of contributions and plugs it into a tracking worksheet. This worksheet has the months of the year across the top and the different sources of contribution (direct mail, corporate donations, meetings) down the side. The worksheet calculates the running totals and the percentage of total contributions that came from each source. PAA then generates year-to-date charts that show the state of contributions.

Making the spreadsheet is straightforward in all of the programs. It is charting where things get interesting. ClarisWorks lets you create a chart right in the spreadsheet, rather than as a separate document.

ClarisWorks is also the smartest program, labeling the values and categories correctly and clearly without any tweaking (see "Year-to-Date Charting"). Other programs either group the category



INTEGRATED OVERVIEW

Company	Product	Modules	Retail Price	Advantages
Beagle Bros	BeagleWorks 1.0	word processing, draw, color paint, spreadsheet, chart, database, communications	\$299.95	good integration via System 7's publish and subscribe, with ability to edit published data in the subscriber document; innovative user interface; deepest feature set; word processor supports multiple columns and irregular text wrap
Claris Corporation	ClarisWorks 1.0	word processing, draw, spreadsheet, chart, database, communications	\$299.00	best balance of power and ease of use; interfaces similar to those of more powerful Claris products; easy, transparent integration between word processing, spreadsheet, and draw modules
Zedcor	Desk 3.07	word processing, draw, black-and-white paint, spreadsheet, chart, database, telecommunications	\$399.95	individual applications are quite good; DeskPaint and DeskDraw are great for quick graphic tasks
Symantec Corporation	GreatWorks 2.0	word processing, draw, color paint, spreadsheet, chart, database, telecommunications, outliner	\$299.00	only package with an outlining module; interface consistent across modules; easy to use
MacVank USA	HandiWorks 1.0	word processing, draw ¹ , spreadsheet, chart, database ² , telecommunications	\$175.00	inexpensive; very good at page-layout tasks; fine spreadsheet functions; multiple-language support for spelling and hyphenation
Microsoft Corporation	Microsoft Works 2.0	word processing, draw ³ , spreadsheet, chart, database, telecommunications	\$249.00	old reliable; inexpensive; doesn't shine, but gets the job done

¹ Limited to lines and boxes in the frame mode. ² Address Manager DA only. ³ Draw tools available in word processor.

ries incorrectly (GreatWorks, Desk) or label them poorly (BeagleWorks, Microsoft Works).

■ For spreadsheet users, I would recommend ClarisWorks.

Graphics

ALL OF THE PROGRAMS HAVE DRAWING modules with object-oriented drawing tools. DeskDraw gives you control

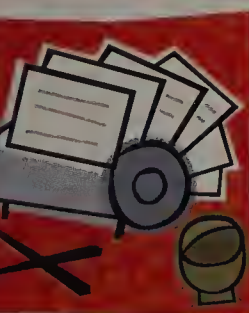


over the transparency of objects. BeagleWorks has a nice object-duplication function. GreatWorks features a Bézier curve tool and gradient fills. None of these programs, however, are going to satisfy the professional artist, though they're all more than adequate for moderate drawing tasks. HandiWorks is the exception, since it has only rudimentary box and line tools.

■ No package stands above the rest in graphics, yet all are fine for occasional use.

Databases

NONE OF THE PROGRAMS ESPECIALLY shine in the database department, either. They are all simple databases that lack lookups, data formatting, and other



features that distinguish stand-alone programs like Claris's FileMaker Pro and ProVue's Panorama II. GreatWorks and BeagleWorks have the strongest

databases overall and are the only programs that let you have picture fields in a database. GreatWorks also lets you assign automatic serial numbers to fields. BeagleWorks has the best sorting and selection feature.

The programs with the weakest database modules are Microsoft Works, because it only lets you have one limited form view, and HandiWorks, because its Address Manager DA isn't a decent substitute for a real database.

■ If you are going to keep track of people, places, or things with a database module, it's a tie between BeagleWorks and GreatWorks.

Limited Storage and RAM

THESE INTEGRATED PACKAGES ARE being targeted for use with the Macintosh Classic, the Classic II, and the LC, all of which often have limited drive space and limited RAM. And owners of the portable Mac PowerBooks, which currently have small hard drives and expensive RAM add-on costs, also need compact, efficient programs. To evaluate how the integrated packages cope with limited resources, I ran all of them on a 2MB Mac Classic running System 6.0.7 and on a 2MB PowerBook 140 running System 7.0.1 (see "Memory Appetites").

On the Classic running System 6.0.7, which gives you the option of turning MultiFinder off, thereby dedicating most of the machine's RAM to the running application, all the programs opened and ran well. It was a different matter on the PowerBook 140, however. Running System 7.0.1 with all extensions off, there was only 1049K of RAM available for a program to use. In this tight environment, GreatWorks and BeagleWorks were at a disadvantage (see "Memory Appetites"). GreatWorks started up fine, but ran sluggishly with more than one document window open. BeagleWorks, which requires a minimum memory allocation of 1024K and prefers 1500K, ran slowly on the low-memory PowerBook. At press time, Beagle Bros was readying an update, due in April, that lowered the memory requirement to 900K, and stated that all registered users would get the update for free. The only two Desk applications I could open simultaneously were DeskWrite and DeskDraw. Attempting to open other Desk programs resulted in out-of-memory messages.

The best performers on the PowerBook were HandiWorks, Microsoft Works, and ClarisWorks, all of which handled the various documents I tried with no problems. Although you can get by with the minimum 2MB configuration, you're much better off bumping

MW

EDITORS' CHOICE

ClarisWorks With an excellent combination of power and ease of use, ClarisWorks nudges its way to the front of the integrated software pack. The program's easy, no-hassle integration of word processing, drawing, and spreadsheets makes it the winner in this suddenly crowded field. **Company:** Claris Corporation. **List price:** \$299.

RAM up to 4MB for the Classic, and to either 4MB, 6MB, or 8MB on the PowerBooks, which require System 7.

Choosing the Right Package

MICROSOFT WORKS HAS LONG BEEN the leader in integrated software, partly by being the lone contender. The newer packages clearly show that Microsoft Works is long in the tooth, and long overdue for a complete overhaul. Zedcor's Desk isn't really an integrated package, although some of the applications work together well.

HandiWorks is attractive for people who are looking mainly for word processing and page-layout tasks, but its weak Address Manager makes it a poor choice for users who need to keep track of lists of people.

BeagleWorks is full of whiz-bang features, but it is a bit more difficult to learn than the other packages I evaluated. With its many modules and unique version of publish and subscribe, it is also more powerful in creating compound documents that combine many disparate elements. For anyone willing to spend the time to master it, BeagleWorks gives ClarisWorks serious competition.

Symantec's GreatWorks 2.0 is a big improvement over the original version. Integration via System 7's publish and subscribe works well, although I still feel that the frame-based programs provide easier integration overall. GreatWorks gets high marks for including an outline module and a color paint module. GreatWorks is a solid program, and it's worth a close look.

That leaves ClarisWorks with the best all-around combination of ease of use and integration. While ClarisWorks isn't perfect—I'd like to see a better database module, in particular—it is more than enough for most beginning users. **m**

See *Where to Buy* for contact information.

TOM NEGRINO is a *Macworld* contributing editor and a contributor to the *Macworld Read Me First Book* (IDG Books Worldwide, 1991).

Advantages

per learning curve than the other programs; publish and subscribe can be cumbersome to set up

base and telecommunications modules could stand improvement

p of separate applications with minimal integration; poor memory management when modules are used simultaneously

age integration overall; publish and subscribe can be cumbersome to set up

ress Manager isn't as good as a real database module; telecommunications module; better drawing tools needed; paint tools

r integration; clumsy draw layer in word processor; ed database; desperately seeking revision

Hubs: Connecting to Ethernet

if

YOU ARE CURRENTLY UP-
grading your network from
LocalTalk to Ethernet, you
are probably installing the
most popular type of wir-
ing: 10BaseT, or unshield-

ed twisted-pair wiring. It is inexpensive, easy to install, and reliable. With twisted-pair you use standard telephone wire to connect computers in a star layout. At the center of the star is a *multiport repeater*, or *hub*—an important piece of hardware that can make or break a network's reliability. The hub receives signals from any device connected to it and repeats them as full-strength, clear signals to all other devices. Without these high-quality signals, the network would slow down. For instance, if a signal fades away or becomes garbled before arriving at its destination, the sender must retransmit the signal.

The star configuration makes 10BaseT more reliable than forms of Ethernet that use a bus layout (where information is passed in a straight line from one device to another) because if one device in a bus layout is improperly terminated, breaks down, or becomes disconnected, the whole network may stop working. In contrast, if one branch of a 10BaseT star has trouble, the hub shuts down that branch, and the rest of the network continues working normally.

The number of 10BaseT hubs you can choose from may surprise you (see "Twisted-Pair Hubs Compared"); such a

B Y L O N P O O L E

variety exists because hubs appeal to a number of markets. Twisted-pair wiring works with a wide variety of computer networks, including Novell NetWare and other networks on DOS computers, TCP/IP networks on Unix computers, DECnet networks on Digital Equipment Corporation computers, and AppleTalk networks on Macs. To help you decide which 10BaseT hub to get, Macworld Lab evaluated 11 of them (see "Testing 10BaseT Hubs").

Hub Connections

A 10BASET HUB HAS MULTIPLE PORTS; you can connect only one network device to each port. You don't daisy-chain multiple devices as you do with other forms of Ethernet, LocalTalk, or PhoneNet. Thus, the hub you buy needs enough ports for every device in the network, plus extra ports to accommodate growth. You can get 10BaseT hubs with a range of ports—common configurations are 8, 12, and 24—and you can interconnect a limited number of hubs. A special type of hub called a *concentrator* consists of a chassis to which you add *modules*, boards containing a number of ports. Concentrators make it easy to expand the number of ports.

You connect computers and other network devices to a 10BaseT hub using standard telephone wires and connectors. A 10BaseT cable consists of ordinary unshielded twisted-pair wires like the telephone wires installed in most buildings. If your building was wired in the past ten years, you may be able to use spare telephone wires to connect a 10BaseT network. 10BaseT uses two pairs of wires; one pair sends data and the other receives. A single twisted-pair segment—from hub to computer—can be up to 100 meters (328 feet) long.

Twisted-pair cables connect to most hubs with 8-pin RJ-45 modular connectors similar to the 4-pin modular connectors you use to plug a phone into a wall jack. The RJ-45 connectors make 10BaseT network hookup a snap, but can create a serious snarl of cables. For a neater, more permanent, and more expensive installation, you can use a hub with

Macworld Lab
finds that hubs—
the devices that
control trans-
mission of data
on 10BaseT
networks—are
highly reliable



one or two 50-pin RJ-21 connectors. Each RJ-21 socket replaces up to 12 RJ-45 jacks. A single thick cable, composed of twisted-pair wires, carries 12 ports from the RJ-21 to another standard piece of telephone equipment called a punchdown block. Anyone with telephone-wiring skills and tools can easily connect the twisted-pair wires from the thick cable to the individual 10BaseT cables running to computers or other networked devices.

Of the hubs tested, only Asanté Technologies' 10T Hub/12 comes with interchangeable connector panels, one with RJ-45 jacks and the other with an RJ-21 socket. Du Pont's LAN One Concentrator, Farallon Computing's PhoneNet StarController EN, and Network Resources Corporation (NRC)'s MultiGate Hub come with RJ-21 sockets only, but you can buy a separate RJ-45 connection panel, called a patch panel, for these hubs. Some hubs that have only RJ-21s come

with an RJ-21-to-RJ-45 converter that looks like a large harmonica, hence its name, harmonica block.

No matter which 10BaseT hub you choose, each device you want to connect to it must have Ethernet capability with a 10BaseT port (RJ-45 jack). Most Macs require an Ethernet adapter board or an Ethernet SCSI adapter box (see "Moving Up to Ethernet," *Macworld*, May 1992). The Quadra computers and the LaserWriter IIx and IIg printers have a special AAUI (Apple Attachment Unit Interface) Ethernet port built-in. For these Macs, you purchase a special transceiver that connects the AAUI to twisted-pair wiring.

Since there are two versions of AppleTalk—Phase 1 and Phase 2—keep in mind that a Mac using one version cannot communicate through a 10BaseT hub with a Mac using the other version. In order to communicate, all computers connected to the same hub must have the same AppleTalk version. Phase 2 is standard with System 7, and all new Macs will support only Phase 2. You can tell which version is installed on a Macintosh running EtherTalk by opening the Network control panel. Single arrowheads in the EtherTalk icon indicate that AppleTalk Phase 1 is installed, and double arrowheads indicate Phase 2 is installed.

Adding More Ports

WHEN A HUB RUNS OUT OF PORTS, you can connect another hub to it. A method called *cascading* involves running a twisted-pair cable from one hub's 10BaseT port to another hub's 10BaseT port. The cable's send and receive lines are crossed so that the send line hooks into the receive portion of each port and vice versa. You can use a regular 10BaseT cable instead of the crossover cable if one of the interconnected hubs has a switch that crosses the send and receive lines on one port. The Asanté 10T Hub/12 and TechWorks' HubWorks-8 have crossover switches for one port, and Sonic Systems' StarBase T has internal jumpers for crossing one port.

Some 10BaseT hubs have an additional port to connect two hubs, thereby conserving a 10BaseT port for connecting a computer or other networked device. This port may have one or more standard Ethernet connectors—AUI, BNC, or fiber-optic. You attach a transceiver that converts one of the available connectors to 10BaseT, and run a regular 10BaseT cable from the transceiver's 10BaseT port to a 10BaseT port on another hub. Sonic's StarBase T hub lets you connect to its AUI port and its BNC port at the same time, but most hubs with a combination of AUI, BNC, and fiber-optic connectors let you use only one at a time.

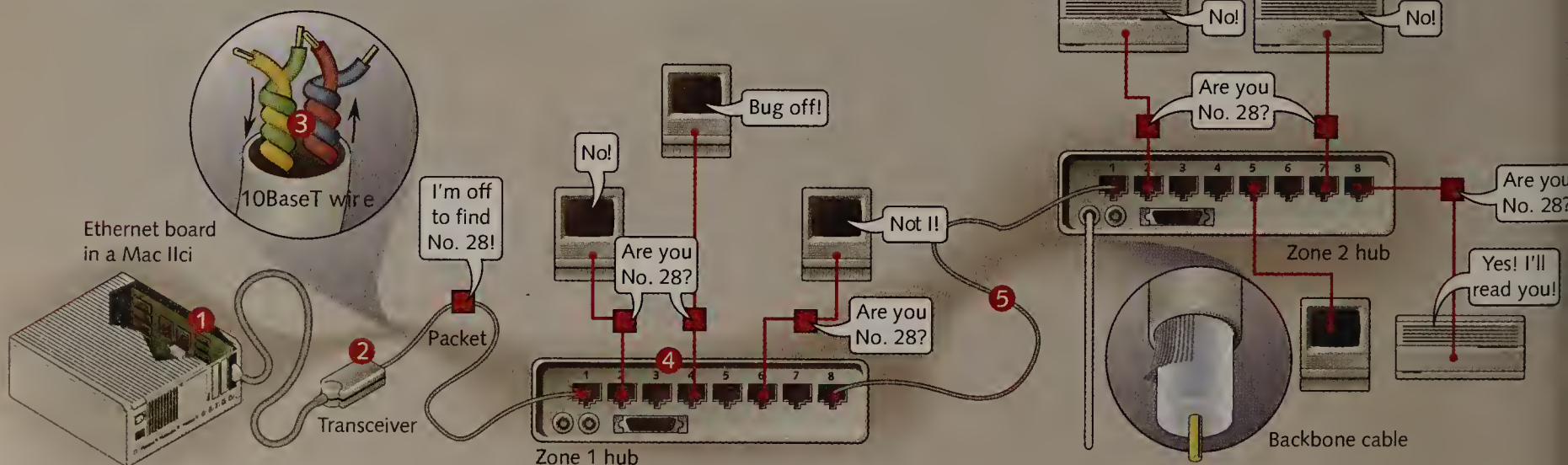
Cascading creates a hierarchy of hubs. For example, you might have a central hub with other hubs branching out from it in a star layout and computers branching out from the peripheral hubs. (You



SCOTT PETERSON

Top to bottom, 12-port hubs include Sonic Systems' StarBase T, Farallon's PhoneNet StarController EN, and Du Pont's LAN One Hub.

How 10BaseT Hubs Communicate



Ethernet boards and EtherTalk system software prepare AppleTalk data packets for transmission on Ethernet cables by adding Ethernet addressing information (1). Ethernet boards also receive data packets, remove the Ethernet addressing, and forward the packets to AppleTalk system software. Transceivers convert an Ethernet adapter's AUI (Attachment Unit Interface) or AAUI (Apple Attachment

Unit Interface) port to a 10BaseT port (2). Unshielded twisted-pair (UTP) wiring is attached to the 10BaseT port; one pair of UTP wires carries data packets from a networked device to the hub, and another pair carries them back (3).

The hub receives the data packets and transmits them to its connected ports (4). Only the networked device to which a packet is addressed pro-

cesses the packet; all other devices ignore it. Hubs can be connected with UTP cables so that networked devices in one zone can communicate with devices in another zone (5).

Backbone cable—thick Ethernet coax, thin Ethernet coax, or fiber optic—carries data packets longer distances than UTP wiring does. Networked devices can be attached directly to the backbone.

Macworld Lab tested the error handling of eleven 10BaseT hubs—the Asanté 10T Hub/12, the Asanté 10T Hub/8, the Cabletron MRXI, the Cabletron MMAC-3 FNB Concentrator, the Dayna Communications DaynaStar MiniHub, the Du Pont LAN One Hub, the Du Pont LAN One Concentrator, the Farallon PhoneNet StarController EN, the Network Resources Corporation (NRC) MultiGate Hub, the Sonic Systems StarBase T, and the TechWorks HubWorks-8.

We ran each hub through a series of tests to determine how well it handled various network errors. In short, we found that hubs are highly reliable. That's good news, since a hub that cannot correct errors (or at least detect them) cannot be expected to send out correct data. Some of the most interesting tests are outlined below.

The IEEE specification says a hub must automatically *partition* (shut down) a port after 30 or more short collisions or after 1 long collision lasting 0.1 to 3.0 milliseconds. In the Macworld Lab, we transmitted packets on 2 ports to create a series of .08ms collisions, and all hubs partitioned both ports after 30 to 37 of these short collisions. Four hubs partitioned both ports after a single long (1ms) collision—Asanté's 10T Hub/12, Du Pont's LAN One Hub, Farallon's PhoneNet StarController EN, and Sonic's StarBase T. Five other hubs—Asanté's 10T Hub/8, Cabletron's MMAC and MRXI, the DaynaStar MiniHub, and the TechWorks HubWorks-8—treated these long collisions the same as short collisions, waiting for 32 or 33 of them before partitioning the ports. The remaining two hubs—Du Pont's LAN One Concentrator and NRC's MultiGate Hub—partitioned after a variable number (1 to 23) of long collisions. However, this doesn't mean these hubs are less reliable—a 1ms collision borders on being a short collision (the IEEE specification is not very strict on defining the borders for short and long collisions). All hubs automatically reconnected a partitioned port after receiving good packets from it.

Several manufacturers claim their hubs automatically detect and correct reversed polarity in twisted-pair cables—that is, they correct cases where the negative and positive receive wires are accidentally crossed. We found that all hubs except Cabletron's MRXI successfully established link integrity with reversed polarity. Polarity correction is a minor benefit because hubs have only a 50 percent chance of correcting a random wiring mistake. They can fix polarity on receive lines, but not on transmit lines. Besides, uncorrected polarity shows up through the status lights as a bad link, and checking cable condition is standard procedure if a bad link occurs.

Our tests indicate that all 11 hubs behave as they should. There are slight differences, but they are well within the IEEE's 10BaseT specification.

ing, only whether it is working well enough for the connected device to receive and respond to the hub's pulses. Most hubs have status lights that show which ports have passed the link test. Many hubs let you disable the link test for individual ports so you can use old Ethernet adapters, which do not respond to 10BaseT hub pulses.

Besides detecting faulty links, all 10BaseT hubs recognize and handle collisions that occur when two or more networked devices transmit data at the same time. A hub stops forwarding packets to or from a port, an action termed *partitioning*, when it detects too many consecutive collisions or too long a collision at that port. The hub continues to monitor port traffic and resumes normal packet forwarding when it sees the first valid packet to or from a partitioned port. Status lights on

many hubs identify partitioned ports.

10BaseT hubs ignore continuous data transmissions that exceed the maximum Ethernet data-packet size. This excessive data-transmission condition, known as *jabber*, usually results in too many collisions and causes the hub to partition the jabbering port. Some hubs have a jabber indicator light that you can use along with partition status lights to diagnose the source of persistent jabber.



From top to bottom, compact 8-port hubs include Asanté Technologies' 10T Hub/8, Dayna's DaynaStar MiniHub, and TechWorks' HubWorks-8.

could also connect computers to the central hub at 10BaseT ports not used for cascading.) In this scenario, data from a computer connected to one peripheral hub must go through three hubs to reach a computer connected to a different peripheral hub. The IEEE's Ethernet standard limits the hub hierarchy, specifying a maximum of four hubs between any two networked devices. In other words, data can hop through at most four hubs from the data source to the destination.

Instead of subjecting your network to the four-hop limit and using up 10BaseT ports to cascade hubs, you can connect multiple hubs to an Ethernet backbone cable. The hubs all need an AUI, BNC, or fiber-optic port. The type of connector determines the type of backbone cable you use. A BNC connector hooks up to thin Ethernet cable, and fiber-optic connectors hook up to fiber-optic cable. An AUI connector requires a transceiver to match the type of backbone cable—thin Ethernet, fiber-optic, or thick Ethernet.

Several manufacturers let you add alternate backbone connectors by plugging modules into the hub. Sonic has an unusual provision for increasing the number of ports in its StarBase T hub. The basic hub has 12 RJ-45 jacks, but only 6 work. You activate the others one pair at a time by installing SIMM-like hub modules.

For large networks, Cabletron, David Systems, Du Pont, and other companies offer concentrators. Their capacities range up to 228 10BaseT ports distributed among 3 to 20 modules. One module handles multiport repeater functions, and the other modules provide 10BaseT ports. You can use modules that work with different kinds of cabling and in some cases different sorts of networks. You can't mix and match modules made for different concentrators, however. Some hubs, such as David Systems' 13-port ExpressNet Hub, can be converted to concentrator modules to enlarge a network.

Hubs in Action

ALL HUBS THAT CONFORM TO THE IEEE 10BaseT specification perform certain tasks. In its role as a network repeater, a 10BaseT hub receives a packet of data from a port, removes minor irregularities, and transmits the packet to all its working ports. The hub knows which ports are working by performing tests and monitoring error conditions.

A 10BaseT hub tests the integrity of the link between each port and the device connected to that port by sending a special pulse to the device. If the device doesn't respond to the pulse, the hub shuts down the port. This integrity test doesn't indicate how well the link is work-

The NRC MultiGate Hub has a handy feature for reducing network traffic—the MultiGate can serve as a *bridge* between an Ethernet backbone and the hub's 10BaseT ports. A bridge reduces traffic by filtering data packets according to their destinations. Hubs that do not offer bridge functions route data packets to all working ports. The NRC MultiGate's bridge feature lets the hub filter data packets according to their network type, including AppleTalk, DECnet, Novell NetWare, and TCP/IP. Besides filtering network traffic, a bridge over-

comes the IEEE limit of four hubs between sender and receiver by dividing the backbone and the 10BaseT ports into separate networks, each of which can have four hubs. Similarly, some concentrators, such as the David Systems ExpressNet Concentrator, support bridge modules.

Hub Management

TO MONITOR MOST 10BASET HUBS, YOU stand in front of them and watch their lights. Status lights can tell you whether a port is busy but not how busy or that a collision is occurring but not how often.

Status lights don't help analyze traffic to optimize network performance and plan network expansion; nor do they notify you at your Mac when problems occur.

To measure traffic, count errors, and receive trouble alerts, you need a *managed hub*, such as Cabletron Systems' MMAC FNB Concentrator and MRXI, Farallon's PhoneNet StarController EN, or NRC's MultiGate Hub. A managed hub, also known as a smart hub or intelligent hub, counts numerous traffic and error statistics for the whole hub and for each port 24 hours a day. The MultiGate Hub, for

TWISTED-PAIR HUBS COMPARED

Company	Product	Number of Ports	Price	Management (In-Band/ Out-of-Band)	CONNECTORS AVAILABLE		
					RJ-45	RJ-21	AUI
3Com Corporation	LinkBuilder 10BT	12	\$1095	○/○	●	○	●
	LinkBuilder 10BTi	12	\$1995	●/●	●	○	●
	LinkBuilder ECS	4-120	\$2290-\$22,650	●/○	●	○	●
	LinkBuilder 3GH	88	\$31,525+	●/●	●	○	○
	MultiConnect	45	\$1650-\$5995	○/○	●	○	●
Anco Corporation	E-Net 10Base-T 8-Port Hub	8	\$450	○/○	●	○	●
	E-Net 10Base-T 12-Port Expandable Hub	14	\$950	○/○	●	○	●
Asanté Technologies	10T Hub/8	9	\$399	○/○	●	○	○
	10T Hub/12	14	\$799	○/○	●	●	●
Cabletron Systems	MR9T	9	\$695	○/○	●	○	○
	MRX	12	\$1395	○/○	●	●	●
	MRXI	12	\$2195	●/●	●	●	●
	MMAC FNB Concentrator series *	12-168	\$1250-\$1850	●/●	●	●	●
Chesapeake Systems	SuperStar 9	9	\$499	○/○	●	○	●
	SuperStar 18AB	18	\$1098	○/○	●	○	●
ChipCom	OnLine Workgroup Hub 5108H-TP	9	\$595-\$695	○/○	●	○	●
	Online Workgroup Hub	14	\$1995	●/○	●	○	●
	6-Slot Online System Concentrator *	48	\$2295	●/○	●	○	●
	17-Slot Online System Concentrator *	180	\$4950	●/○	●	○	●
David Systems	VolksNet	13	\$795	○/○	●	●	●
	ExpressNet Hub	13	\$1695	●/●	●	●	●
	5-Slot ExpressNet Concentrator *	12-48	\$900	●/●	●	●	○
	12-Slot ExpressNet Concentrator *	12-132	\$1200	●/●	●	●	○
	12-Slot ExpressBus Concentrator *	12-144	\$1995	●/●	●	●	○
Dayna Communications	DaynaStar MiniHub	8	\$449	○/○	○	●	○
	DaynaStar Hub-12	12	\$995	○/○	●	●	●
Du Pont Electro-Optic Products	LAN One Hub	12	\$995	○/○	●	○	●
	LAN One Concentrator *	12-60	\$3715+	●/○	○	●	○
	Paragon Concentrator *	12-228	\$7880+	●/●	○	●	○
Farallon Computing	PhoneNet StarController EN	12	\$1895	●/●	○	●	○
Hewlett-Packard	HP EtherTwist Hub-8	8	\$650	○/○	●	○	○
	HP EtherTwist Hub-Plus	12	\$1895	●/●	●	○	●
	HP EtherTwist Hub-Plus 48	48	\$4795	●/●	●	○	●
NetWorth	EtherNext MicroHub	9	\$645-\$675	○/○	●	○	○
	Series 4000 Concentrator *	12-120	\$239-\$24,000	●/●	●	○	●
Network Resources Corporation	MultiGate Hub	32-134	\$2495-\$3495	●/●	○	●	●
Shiva Corporation	Hublet	4	\$299	○/○	●	○	○
Sonic Systems	StarBase T	7	\$499	○/○	●	○	●
	StarBase T+	13	\$699	○/○	●	○	●
SynOptics Communications	LattisNet 2800	12	\$995	○/○	●	○	●
	LattisNet 2810	12	\$1995	●/●	●	○	●
	LattisNet 2310	38	\$5495	●/●	●	○	●
	LattisNet 3000 Concentrator *	12	\$2750	●/●	●	●	●
TechWorks	TechWorks HubWorks-8	8	\$399	○/○	●	○	●
Thor Manufacturing	MixNet StarMaster 8E	8	\$699	●/●	●	○	●

● = yes; ○ = no. * Concentrators include a multiport repeater module and one or more 10BaseT modules. You can combine modules to create configurations with varying numbers and types of ports.

one, comes with *in-band* management software that lets you gather statistics and manage multiple hubs from a Mac anywhere on the network. Other companies offer in-band management software as an option. To manage Cabletron's MMAC or MRXI in-band, you must buy Cabletron's \$3995 MacLANView software. Similarly, to manage the PhoneNet StarController EN in-band, you must install one of Farallon's extended-management LocalTalk hubs. Both LocalTalk and Ethernet hubs can then be managed at once from one Mac.

	Cascade Port	Disable Link Integrity	Warranty
	●	●	3 years
	●	●	3 years
	●	●	1 year
	○	●	1 year
	○	●	1 year
	●	○	2 years
	●	○	2 years
	●	○	5 years
	●	●	5 years
	●	○	90 days
	●	○	90 days
	●	○	90 days
	○	●	1 year
	○	●	1 year
	●	○	1 year
	○	●	1 year
	●	●	1 year
	●	●	2 years
	●	●	2 years
	●	●	2 years
	●	●	2 years
	○	○	1 year
	○	○	1 year
	○	○	1 year
	○	●	1 year
	○	●	1 year
	○	○	5 years
	○	●	1 year
	○	●	1 year
	●	●	1 year
	●	●	1 year
	○	●	3 years
	●	○	5 years
	●	○	5 years
	●	○	5 years
	●	●	1 year
	●	●	1 year
	○	●	1 year
	○	●	1 year
	●	●	lifetime
	●	●	1 year

Some hubs include *out-of-band* management software that lets you gather statistics without adding overhead to the network and manage hubs even if the network is down. Other hubs, such as the MultiGate Hub, MMAC, and MRXI, let you manage a network out-of-band, albeit less elegantly—you gather statistics by running an inexpensive terminal program on any computer connected to the hub's special management port.

Not only can you monitor managed hubs with management software, but you can also control them. Farallon and NRC software, for example, can turn individual ports on and off and can enable and disable the link-integrity test for any port.

Managed hubs can detect hub and port errors, such as jabber and collision, at the hardware level. Tracking such errors helps you spot electrical interference, cross talk, malfunctioning transceivers, and unreliable Ethernet adapters. What's more, network analyzer programs gather statistics only while running on a networked Mac, whereas managed hubs gather statistics continuously.

Choosing a Hub

MANAGED HUBS COST CONSIDERABLY more than unmanaged hubs. You can justify the extra expense if the success of your business depends on your network's optimum performance and minimum downtime, which a managed hub's statistics help you achieve. Traffic and error statistics can also save you time in setting up a large network or in expanding your network. Of the managed hubs we tested, Farallon's PhoneNet StarController EN costs the least, but NRC's MultiGate Hub in a configuration of 24 10BaseT ports is a better value with its out-of-band management, built-in bridge, and backbone port options. Cabletron's MMAC will appeal only to those with large networks and large budgets.

If you want an unmanaged hub, you have many to choose from. All hubs perform equally, and the ability to cascade 10BaseT hubs from different manufacturers makes them all inherently expandable. A backbone port increases expandability, and you must have one if you need to connect your hub to an Ethernet backbone. If you have old Ethernet adapters that don't support 10BaseT's link-integrity testing, you need a hub that lets you switch off link-integrity testing, port by port. Apart from those considerations, cost and the number of 10BaseT ports you need are the crucial variables. Get out your crystal ball and see how many ports you will need six months or a year from now (figure at least 50 percent more than you need now). Then buy the hub with

MW EDITORS' CHOICE

TechWorks HubWorks-8 A good bet for small networks, this unmanaged hub has eight RJ-45 ports, one of which you can switch for cascading without a crossover cable. This hub can connect to a backbone using its AUI port or its BNC port. It has a good manual and a lifetime warranty. **Company:** TechWorks. **List price:** \$399.

Asanté 10T Hub/12 This low-price unmanaged hub has all the features a midsize network needs—disable link integrity, a dual backbone port, a switchable twisted-pair crossover port, and an interchangeable twisted-pair connector panel. **Company:** Asanté Technologies. **List price:** \$799.

MultiGate Hub If you need a managed hub, MultiGate has capabilities well worth its higher price, including complete in-band management from any Mac, out-of-band management from any computer, a built-in bridge, and up to three backbone port connectors. It also has the best manual we saw. **Company:** Network Resources Corporation. **List price:** \$2495–\$3495.



Concentrators such as Cabletron's MMAC-3 FNB Concentrator provide optimal expandability. You buy a chassis and then purchase modules (1) that provide connectors such as RJ-45 (2), fiber optic (3), and thick Ethernet (4). Modules can also provide extras such as a modem connector for out-of-band management (5) and status lights (6).

the features you need and the best price per port. Keep in mind that you'll pay less than the list price if you buy from a discount store or mail-order company. **m**

See *Where to Buy* under "Star Controller Hubs" for contact information.

Contributing editor LON POOLE is author of *Macworld Guide to System 7* (IDG Books Worldwide, 1991) and *Amazing Mac Facts* (Microsoft Press, 1991).
Macworld Lab testing supervised by TIM WARNER.

Math

ANALYSIS

FIVE MATH PROGRAMS THAT HELP SCIENTISTS

AND ENGINEERS SOLVE COMPLEX COMPUTATION

by Charles Seiter

In the original vision of Charles Babbage, the computer was a steam-driven gear-and-ratchet machine that would calculate and print mathematical tables. In the visions of John von Neumann and Alan Turing almost a century later, the computer would be a general-purpose device capable of abstract manipulation of logical symbols. Finally, the vision of Alan Kay and others a few decades ago saw the computer as a dynamic notebook, using processor power to solve problems expressed in the user's own notation and to provide reference information.

A Macintosh outfitted with the latest mathematics software embodies all these visions and more. A few years ago an explosion of math software occurred, as multimegabyte Macs provided the memory needed to accommodate programs originally designed for workstations and minicomputers.

Today, there is a range of math software designed for many types of users, from chemical engineers to biologists to nuclear physicists. And even for pure mathematicians. These programs fall into

two basic categories: symbolic manipulation and engineering.

Symbolic Manipulation

SYMBOLIC MATH PACKAGES CAN PERFORM algebraic transformations on equations and math expressions. Because most principles in science are summarized with an equation rather than a number, transformation is often used to simplify results or to expand expressions to explore the meaning of individual terms.

The main programs in this category are Wolfram Research's *Mathematica*, Brooks/Cole Publishing's *Maple*, and Prescience Corporation's *Theorist*.

■ *Mathematica* This is probably the best-known symbolic math program. That's partly because it provides a comprehensive set of numerical and symbolic routines (2.0 includes 843 functions), but also because the reputation of its remarkable developer, Stephen Wolfram; secured its early adoption by leading research centers. Wolfram's background in many types of physics convinced him that a math program should contain any facil-

ematics

ity that a researcher is likely (or even unlikely) to need, and Mathematica's capabilities are indeed vast.

Mathematica has a serious advantage over its competitors not only in scope and programmability but also in the quality and quantity of its support literature. The Mathematica Help Stack from Variable Symbols is a model technical help program; Stan Wagon's *Mathematica in Action* (W. H. Freeman, 1991) is one of the most entertaining, serious mathematics books yet produced; and the Mathematica book series from Addison-Wesley (1988-1992), covering topics from discrete mathematics to programming, is likewise excellent.

Cathy Stockwell, an engineer at Lockheed Technical Operations, needs all three types of capabilities that Mathematica offers for her work with satellite control: symbolic math for transforming and simplifying the equations of satellite orbital mechanics, numerical operations for computing actual trajectories, and 2-D/3-D graphics for inspecting the orbits. (Try to picture evaluating an orbital calculation from a table of computed results, and you see how crucial graphics are.)

All orbital problems have a distinct underlying similarity, which means you can use a set of related computations to handle them, rather than a completely new set for each problem. Mathematica offers a Notebooks feature that lets users easily produce active files of results from sets of related computations. Notebooks store dynamically linked equations, text, and figures; for example, a solution notebook for one type of satellite orbital problem can be extended into a series of notebooks with similar orbital maps, descriptions, and modified satellite data.

Wolfram Research sells three versions of Mathematica 2.0 (a Mac Plus/SE version for \$595, a student version for \$175, and a coprocessor version for \$895). Most Mathematica users probably encounter the product through a site license.

The program is a tight fit in 4MB of RAM (6MB is necessary for serious work), so a stand-alone Plus or SE is not an ideal platform. Mathematica's memory demands are directly related to the high number of features in version 2.0. This new version has built-in sound capability and waveform analysis, numerical integration of differential equations, support for debugging and code tracing in the Mathematica programming language, a numerical-expression compiler, and nearly 300 new functions.

■ *Maple V* Like Mathematica, Maple V (\$450, \$132 for the student version) offers every type of function normally encountered in math or science work to the Ph.D. level and beyond (the Maple manual index lists more than 1400 functions).

Maple's roots, like Mathematica's, reach back to the beginnings of symbol-manipulation programs (the mainframe-based Macsyma in the early 1970s), but Maple's developers at the University of Waterloo in Canada took a more conservative programming approach than Wolfram Research did for Mathematica. Instead of being a single, giant package, Maple has a smaller core (about 600K) and modules of function sets (nearly 8MB all together) that you load as needed. Maple can thus run handily on a stock Mac SE—even on a 2MB Classic—making Maple a good choice for educational settings in which smaller Macs aren't networked to more powerful hardware.

Phoebe Judson of Trinity University has designed her calculus lab around



Ted Mitchell, a business professor at the University of Nevada-Reno, finds the focused tool set of Prescience's Theorist ideal for business computations and visual analysis.

Maple and the Maple calculus workbook. She reports that beginning calculus students usually find the program easier to use than Mathematica, both for small special projects and for standard homework in differentiation and integration.

The \$132 student version includes the complete Maple algebra system and library, and separate packages for linear algebra, number theory, graphics, basic statistics, optimization, and orthogonal polynomials. Judson thinks it's a bargain on price compared with Mathematica (the student system includes a coprocessor version) and a bargain on features compared to Theorist (which lacks comprehensive advanced-math packages). Maple V is a rewritten and reoptimized version of Maple 4.2.1; additions include three-dimensional color graphics, fast Fourier transforms, and a Maple-to-C language translator.

■ **Theorist** Prescience's Theorist 1.11 is unique among these symbolic-manipulation products in several respects. It's available only in a Mac version (the others are available for Unix workstations and DOS/Windows PCs). It represents equations in real math notation (Prescience also developed the equation-writing program Expressionist). Theorist depends mostly on menu-based commands for its operation (Mathematica and Maple are really extensions of C programming by comparison). And because it has a much smaller set of functions than the other main Mac symbol processors, Theorist can be mastered quickly.

This simplicity makes Ted Mitchell, a professor at the University of Nevada-Reno, believe that Theorist is the right math program for students in his business classes. For business students, the availability of number-theory modules or

built-in Fourier transforms common to other programs is a distraction, he says.

With Theorist, Mitchell has developed a set of case studies in quantitative management methods, ranging from simple break-even models to formal time-series analysis of marketing data. Theorist offers complete graphics capabilities (including 3-D color surface plots), so Mitchell's case-study assignments on disk let students explore business data visually as well as computationally.

This approach recognizes that graphs and fairly simple equations are usually more appropriate than high-end math machinery for analyzing noisy and often incomplete business data. "Theorist lets the students think through the principles of an analysis without worrying about the mechanics of symbol manipulation in deriving simple results," Mitchell says.

Despite its simplicity, Theorist includes a respectable assortment of functions (including those for matrix algebra, special functions of physics, and symbolic calculus), an animation feature for reviewing the time evolution of computed graphics, and easy PICT/EPS file transfer for desktop publishing. To encourage undergraduate use, Prescience has a site license/academic discount program.

Archimedes' Little Helpers

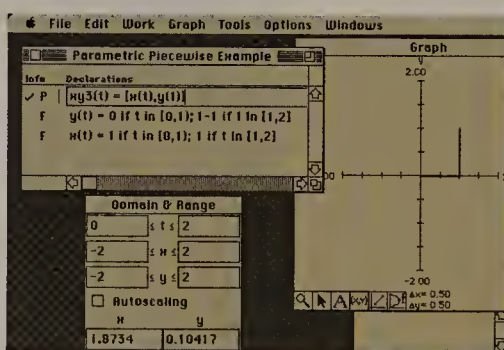
All the programs featured in this article aim to provide solutions to a wide range of math problems. For more modest aims, modest budgets, or modest platforms, it's worth considering a selection of other programs.

Brooks/Cole Publishing, besides offering Maple V, offers two other math products. Calculus T/L (\$39.95), which is based on a subset of Maple, offers symbolic and numerical capabilities grouped around the topics normally covered in a first-year calculus course and provides an automated version of many paper-and-pencil calculus exercises. TeMath (\$39.95) offers a wide assortment of graphics tools and numeric capabilities for exploring precalculus and calculus textbook topics (for more on TeMath, see *Reviews, Macworld*, April 1992).

Lascaux Graphics offers the program f(z) (\$89.95) for exploring complex variables graphically, Fields & Operators (\$99.95) for vector calculus, and the outstanding program Models (\$89.95) for investigating systems of iterated equations (see *Reviews, Macworld*, March 1992). Models is probably the easiest system ever presented for exploring chaotic-dynamics, economic, and ecological models, as well as time evolution of complex systems behavior.

For symbolic and numeric computation in its most compact form, PowerMath II 2.51 (\$149.95) from Central Products Corporation is worth considering. This program runs on any Macintosh, from the ancient 128K to the Quadra series, and is respectably fast and easy to learn. If you've got the space, the student version of Maple offers more for the money, but PowerMath II at least gives you a way to extract some value from a 512K gathering dust.

Finally, you can implement a minimalist approach to math with the tools in the catalog from Heizer Software, specialists in add-ons for Microsoft Excel, Microsoft Works, and HyperCard. Individual packages of Excel macros, for example, handle Fourier transforms, time-series analysis, special functions of physics, and statistics. If you want to perform specific tasks in the friendly environment of a familiar spreadsheet, Heizer can give you access to advanced math functionality for about \$20 per module.



Calculation Tool Suite

Brooks/Cole Publishing's TeMath can handle very complicated function definitions for plotting, including parametric plots specified piecewise.

Engineering Analysis

ONE IMPORTANT CATEGORY OF MATHEMATICS users is engineering, where the final result of an analysis is more often a number than a symbolic expression. Programs emphasizing numerics are faster than symbolic packages at raw calculation, which is an advantage to engineers working under deadlines, and the vendors have anticipated exactly what engineering users need, offering results tailored to specific engineering problems.

The mainstay applications for Mac-based engineers are The MathWorks' MatLab and MathSoft's MathCAD.

■ **MatLab** The MathWorks' MatLab 3.5 (\$795) offers the fastest matrix operations of any program available commercially, plus special toolboxes for modeling, time-series analysis, digital signal processing, and control systems, among others. In many cases, the combination of MatLab with a toolbox offers, in canned form, the required solution to a particular engineering problem.

But it is MatLab's script language that turns out to be one of the program's principal attractions for Michael Brooks, a scientist and electronics designer at Hughes Aircraft's radar applications division. In an environment full of Macs, DOS PCs, and Sun Sparcstations, MatLab's script language lets Brooks write custom modifications of toolbox routines for computer-

aided control systems and simulating electronic filters. "We have all sorts of platforms and essentially every piece of published math software, and at many tasks we find MatLab to be the system to use," Brooks observes.

■ **MathCAD** Version 2.0 (\$495, \$175 for educational institutions) offers another example of vendor concern for user productivity. Besides the basic program, MathSoft also sells two kinds of statistics applications packs, an advanced numerical-methods pack, an electrical engineering pack (MathCAD already includes an "electronics handbook" full of useful formulas and constants), two mechanical engineering packs, two packs for civil engineering and one for chemical engineering, and a special educational pack on basic math methods. From designing concrete beams to planning chemical batch reactors, MathSoft offers an off-the-shelf solution.

The program itself, while not as incredibly fast as MatLab, includes an engineering equation solver; an advanced function library that includes Fourier transforms as well as matrix arithmetic; a reasonable approximation of correct math notation on screen; and nice integration of text, equations, and graphics for presentation-quality reports.

Because most of his students major in science or engineering rather than math, James Rowell of the University of Minnesota at Duluth uses MathCAD instead of a symbolic math package for calculus instruction, and has written a MathCAD textbook emphasizing mathematical modeling. Because MathCAD runs on any Mac and offers add-on packages for specific applications, he sees it as a practical choice that students can use throughout their engineering curriculum.

MathCAD 3.0 on Windows-based PCs already offers a capability expected for the Mac version later this year: symbolic math in an engineering-oriented program. MathSoft has incorporated the core symbolic algebra capabilities of Maple into MathCAD, under an agreement in which MathSoft also becomes a Maple distributor—the Mac version including a Maple core will offer engineers a striking value.

■ **HiQ** Another program that emerged this spring for engineers is the long-awaited HiQ from Bimillennium Corporation. Its principal developer, David Russell, wrote MathView Professional, one of the first math programs for the Mac, and he has paid particular attention to computational efficiency in HiQ.

The result, according to beta user Jeffrey Kane, a biomedical researcher at Massachusetts General Hospital, is a pro-

gram that formulates large systems of coupled differential equations with remarkable ease and solves them 20 to 50 times faster than Mathematica does. A powerful scripting language combined with HiQ engineering notebooks lets Kane specify models of oxygen transport in tissue culture (basically, animal cells growing artificially in special bottles or plates), ranging from simple diffusion models to finite-element models that account for detailed properties of cell layers. Because parts of models can be easily copied from one HiQ notebook to another, it is simple to construct a hierarchy of models of increasing conceptual complexity. Other beta sites were equally enthusiastic about HiQ's speed and script language, emphasizing that the product has been clearly tailored to engineering uses.

Making Decisions

SOME SOFTWARE CHOICES HERE ARE obvious. If you are a theoretical physicist at a major American university, you probably already have Mathematica. Similarly, if you design complex digital filters in the radionics division of an aerospace company, you are probably one of MatLab's 100,000-plus users.

These two application areas specifically call for the highest order of capabilities in symbolic and numerical computation respectively. In the case of Mathematica, there are the additional advantages of the biggest infrastructure (books, tutorials, and classes) in scientific computing and a well-designed programming system; in the case of MatLab, there's a decade's experience in tailoring solutions to engineering problems.

For another category of scientists—biologists, economists, physical chemists, and surprisingly enough, some types of mathematicians—the routine computational load may not justify high-end hardware or much investment of time in mastering software details. These people should be pleased to hear that Maple now offers the same range of transformations as Mathematica does (Mathematica still has distinct advantages in graphics, in its new sound/DSP features, and in programming for complex problems), performs acceptably at numerics, and runs on a modest Mac.

MathCAD and Theorist also have modest hardware and training requirements, but take different approaches.

MathCAD is almost like an automated version of the famous *Schaum's*



ROBERT HOLMGREN

Handbook (McGraw-Hill) series of paperback science and engineering textbooks: through the program or through its add-ons, MathSoft tries to anticipate every type of common problem and solve it for you. You might use Maple or, more likely, Mathematica to generate a computer-based proof of a theorem in tensor calculus, but you would almost certainly be happier turning to MathCAD for a simple one-page beam-deflection problem.

Theorist, in contrast, has good graphics, real on-screen math notation, and general-purpose symbol-manipulation capability; but Theorist has a limited rule set. As an instructional system Theorist at least forces students to think through most of their own problem-solving rules, and for some research problems it's efficient. But it's also far from the canned-solution machinery of the other packages, which is not a criticism.

As a guideline in program selection, one last word may be helpful: base your decision on your limitations, not the program's. Any one of these packages, even on a low-end Mac, can do things scientists 20 years ago could only dream about. When you look at the range of the program's capabilities, ask yourself how much time you want to invest in getting the software to solve your problems. If you have complex and changing needs, the investment in a larger package is well repaid; if you need an answer by noon Friday and it's Thursday morning now, something smaller is the better choice. **m**

See *Where to Buy* for contact information.

CHARLES SEITER, a *Macworld* contributing editor, has worked with symbolic math programs since the late 1970s.

Cathy Stockwell, an engineer at Lockheed Technical Operations, controls satellite movement using Wolfram Research's Mathematica to calculate satellite orbits.



RENDERING PROGRAMS LET YOU SPECIFY ALL

THE ELEMENTS YOU NEED

TO MAKE A 3-D

SCENE LOOK REALISTIC

Rendering

Making Realistic 3-D Graphics

If you watch much television or read many magazines, then you've surely seen some slick three-dimensional graphics. But before you try to create your own, you need to carefully choose the software and hardware it takes to make realistic images—and you have to set aside a large chunk of time to master the process. ■ First, you need a 3-D modeling package to build a representation of a scene (see “3-D: Structure, Surfaces, and Movement,” *Macworld*, February 1992). Then you use a rendering program to specify *surface attributes* (textures, lighting, and special properties such as transparency or reflection) of objects in the scene. Finally, the Mac takes the data you have specified and renders a photo-realistic image of the scene. Whether it takes minutes or days to render an image depends on program performance, type of rendering, scene complexity, and type of Mac you use. ■ This article reviews 10 programs that offer photo-realistic rendering capabilities. These programs simulate realistic transparent, textured, and reflective objects. Capabilities vary widely enough that serious 3-D users may end up owning two or more of the programs. ■ **Creating Surfaces** All of the renderers can create basic surface properties, such as matte, shiny, and transparent finishes. (These basic properties are generally used to create plastic, metal, and glass surfaces.) Most programs give you immediate visual feedback when you change the shininess or transparency of an object. Typically, the program displays a round ball on a patterned background within a dialog box. As you change the degree of, say, transparency for a selected object in the scene, the ball (which stands in for the selected object) becomes more or less see-through.

■ The only programs that don't give you immediate visual feedback for surface properties are Byte by Byte's Sculpt 3D, Sculpt 4D, and Pixar's MacRenderMan. These programs require you to render the scene or an individual object each time you want to see the effect of a change. Because rendering can be slow, this method discourages much experimentation. (MacRenderMan does come bundled with Showplace, a program Pixar developed as a front end for arranging and viewing objects without rendering.) ■ To add texture, such as that of wood or marble, to an object, you need a renderer with texture-mapping capabilities. Texture mapping is the process of applying a PICT or

BY DAVID POOLE

TIFF image file to a 3-D object. The type of texture mapping you use depends on the shape of the object you are rendering. For example, if you're mapping an image of the earth onto a sphere, you use spherical texture mapping. Or if you need to map a brick texture onto a building, you use cubic mapping. Other common mapping types include cylindrical (for wrapping labels onto cans) and planar (for projecting images onto flat surfaces, like billboards).

Although all the programs can accomplish planar, cylindrical, and spherical mapping, not all of them

ate a bumpy surface, gray-scale images are generally used—the color information would be redundant. The most capable program for creating bump maps, Electric Image's ElectricImage Animation System, offers in-depth control, allows you to have two bump-map images per object, and creates pronounced, high-quality bumps.

Creating Reflections

ADDING REFLECTIONS TO METALLIC AND GLASS surfaces can be accomplished by using either reflection maps or ray tracing. In ray

tracing, the program uses algorithms based on natural laws to create reflections. These reflections are highly realistic, making objects appear to truly reflect their environment.

Reflection maps produce less realistic images than does ray tracing. A reflection map, like a texture-map, is an image file. Unlike texture files, which are attached to the object, reflection maps wrap around the space surrounding the object. This creates the illusion that the object reflects its environment, but makes it extremely difficult to mirror individual, detailed objects. Reflection maps work best on surfaces that distort whatever they reflect—say, on a curved candlestick or chrome logo.

Procedural Textures and Bumps

PROCEDURAL TEXTURES don't require the use of an image file. They are generally

used to create wood and marble textures and are generated by a computer from algorithms that define the color, size, pattern, and distortion of the texture. Procedural textures cover a 3-D object naturally, as if the object were carved from a hunk of the texture. Each



"ALICE" © CHUCK CARTER/CYAN

Alice from Infini-D

This conglomeration of objects from Alice in Wonderland was ray traced in Infini-D. Note the reflections in items such as the pocket watch and Drink Me bottle. The user specifies the percent of reflectivity desired, and the program calculates and creates the reflections. Environment maps were used to make the surface of the teapot and the metal on the key and the watch look slightly reflective.

support other types. Alias Research's Alias Sketch and Sculpt 3D and 4D, for example, don't offer cubic mapping. To get the effect of cubic mapping in Alias Sketch or Sculpt, you have to create six separate flat planes with a texture on each and then combine them to simulate a cube. Be careful when you use this type of texture-mapping kludge. If an object doesn't have the right surface or texture, then the illusion you are trying to create may be destroyed.

Creating Bumps and Dents

ANOTHER POPULAR WAY TO CREATE SURFACE textures is to use a process called bump mapping, which creates the appearance of nicks, dents, or bumps in a 3-D model. If you needed to create a photo-realistic image of an orange, you'd be hard put to create a 3-D model that included all the dimples. An easier approach is to apply a bump map to a sphere; the bump texture employs the variation in light and shadow to create the impression that there are hundreds of little dimples on what is actually a plain old sphere.

A bump map, like a texture map, is an image file that is projected onto an object. Since bump mapping uses only the light and dark values of an image to cre-



MacRenderMan's Kitchen MacRenderMan calls bits of code, or shaders, to create the textures in its images. Every element in this image is based on a shader that MacRenderMan created, including the metallic knobs on the cabinets and refrigerator.

program uses its own algorithms for procedural textures, thereby creating different results. MacRenderMan offers incredibly high-quality procedural textures of great diversity.

Like procedural textures, procedural bumps are computer-generated. These algorithms create random nicks or bumps on a object. MacRenderMan excels at creating procedural bumps, with Sculpt 3D and 4D coming in a close second.

Light and Shadow

RENDERING PROGRAMS GENERALLY SUPPORT FOUR types of lights—ambient, radial, distant, and spot. Ambient light controls how dark and what color the darkest areas will be. High ambience gives the impression of daylight; low ambience creates a starkly lit scene, such as you would find at night or indoors. All the programs support ambient light. Radial lights generate light outward in all directions, much as does a light bulb. Distant lights can be pointed in a specific direction, giving the impression of, for instance, sun lighting an entire scene from the west. Spotlights focus one intense beam of light and behave very much like their theatrical counterparts.

As with texture mapping, the lighting capabilities of these programs differ greatly. Some programs offer all four light types. Some programs have ambient light but no spotlights. Others have spotlights but no distant lights. Sculpt 3D and 4D and AT&T Graphics Software Labs' MacTOPAS determine the position and intensity of a light, but don't let you aim it in a particular direction. MacRenderMan, Electric-Image, Strata's Stratavision, MacroMind Paracomp's



MacroMind Three-D, and VIDI's Presenter Professional excel at lighting. MacroMind Three-D offers immediate visual feedback and is very flexible, allowing you to adjust the fuzziness of spotlights, the amount that the light will fade, and other parameters.

It would seem that if a program could simulate the appearance of bright sunlight, then it could produce shadows behind every well-lit object in a scene. Not so. Shadows are not treated equally by all rendering programs. Some programs allow only one light source to cast shadows, while other programs can create shadows only under certain conditions. To

Chessboard from Alias Sketch This image uses ray tracing to create realistic reflections and refractions. Note how the chess pieces reflect one another. The artist built the chess pieces out of glass and assigned a specific refractive index for the glass material. As a result, some pieces distort light as it shines through them.

Faster Rendering

Rendering speed is directly related to how complex an image or animation is. As you add more objects, lights, and textures, rendering speed decreases. This is why many people render elements separately and then composite them later by using alpha channel masks. The only other option is *distributed processing*.

Distributed processing is a loosely used term that basically means distributing the work load of one computer to other processors. In the case of rendering, it means sending various rendering tasks either to coprocessor boards installed in a Mac or to other Macs on a network. Unlike accelerator boards, coprocessor boards are designed specifically to speed rendering. Some informal tests that I conducted revealed that these boards are eight times faster than a Mac IIx—a speed that is roughly equivalent to workstation performance. If all you're after is fast rendering, then buying one of these boards and a used Mac II is better than buying a new Quadra.

Currently, Yarc Systems and StarTech offer coprocessor boards that cost between \$4000 and \$8000, depending on the configuration you choose. The boards work only with certain programs, however; Yarc Systems' Nusprint board works with Sculpt 3D/4D and Presenter Professional, and StarTech's RenderEdge board speeds MacRenderMan. For a real speed boost, you can install three or four boards in one Mac and have them all work on one image. (The one exception is Presenter Professional, which does not support this feature while running on the Nusprint). Although a single- or multiple-board solution is expensive, you may find it worth the expense to increase performance by 10 to 20 times.

Radius plans to release Saturn V, a technology that will allow multiple Radius Rocket accelerators to work in tandem on a rendering job. This means that you could potentially have four Rockets in the same machine, each rendering a part of an image.

Another solution for increasing performance is *network rendering*, which works by parceling out pieces of an image to several Macs on a network. Ideally, network rendering cuts the rendering time proportionately, depending on the number and type of Macs on a network. Although no software was available for testing at the time this article was written, Ray Dream, Strata, Specular International, and VIDI will have solutions shortly. Pixar already has a version of NetRenderMan for the Mac, but it sends Mac image files to Unix machines, not Macs, for processing. (Pixar plans to release software that will render images on a Mac-only network.)



Rodney's Pond from Sculpt 3D This fanciful image uses numerous texture maps, which the artist precisely positioned. Sculpt 3D's rendering algorithm is designed to produce deep, rich colors. Note also the reflections of the fish and the water. The artist created a flat surface under the fish, applied a bump map, and set the level of reflection. Sculpt 3D automatically generated the reflections.

create a more realistic scene, Alias Sketch and MacTOPAS even allow you to type in time and location information (such as March 15, 4:20 p.m., at x longitude and y latitude) to create real-world outdoor lighting conditions.

Miscellaneous Features

SOME RENDERERS SUPPORT ATMOSPHERIC EFFECTS, such as fog or depth cuing. Fog is not as simple as it might sound—to create it, you use an image processing technique that lets you define, from your point of view, how the mist begins and how far it extends before obscuring the image entirely. Fog can add a high degree of realism, creating, for example, a skyscraper disappearing into clouds. Depth cuing makes objects in the distance appear naturally blurred.

Another feature that many users want is the ability to work with composite images. To offer this ca-

pability, a program must support at least one *alpha channel*, an antialiased mask that is included in the rendered image. The mask data in an alpha channel ensures that only the area that has rendered imagery will be used during compositing.

For still-image work, alpha channels make it possible to separate certain elements from each other for processing. An added benefit is that alpha channels can contain transparency information, which means that the background can show through an image (like a pane of glass) when you composite the rendered images.

Alpha channels are also extremely valuable for animation work. For example, when animating objects that will appear in front of a complex background image, it's more efficient to render each frame with the objects on a black background and composite the animated objects and the complex background through alpha channels afterward. This saves the renderer time and hard drive space. There are a number of ways, via hardware or software, to combine rendered images when compiling the layers of the animation for final production.

Selective Rendering

SELECTIVE RENDERING LETS YOU HIDE OBJECTS in order to avoid rendering an entire scene if all you want to do is work on one element. For example, if you are creating a museum showroom full of artifacts, you may want to spend extra time tweaking one particular object. Rather than render the entire scene each time you adjust the texture or lighting for that object, you can select only that object to render, thereby saving immense amounts of time.

Compound Surfaces

COMPOUND SURFACES ARE TEXTURES THAT ARE made up of two or more textures. A number of pro-

A GUIDE TO RENDERING PROGRAMS

	Alias Sketch 1.0.2	ElectricImage Animation System 1.03	Infini-D	MacRender- Man 1.1	MacroMind Three-D 1.0	MacTOPAS
Company	Alias Research	Electric Image	Specular International	Pixar	MacroMind Paracomp	AT&T Graph Software La
Price	\$995	\$7495	\$895	\$995 ¹	\$1495	\$7495
Cubic mapping/bump mapping	●/●	●/●	●/●	●/●	●/●	●/○
Reflection mapping	○	●	●	●	●	●
Procedural textures and bumps	○	○	●	●	●	○
Spotlights/point lights	●/●	●/●	●/●	●/●	●/●	○/○
Distant lights	●	●	○	●	●	●
Fog/depth cuing	○/○	●/○	○/○	●/●	●/●	●/●
Alpha channels	○	●	○ ²	●	●	○
Renders selected objects or areas	●	●	●	●	●	○
Compound surfaces	○	●	●	●	●	○
Ray tracing/suspended ray tracing	●/●	○/○	●/○	○/○	○/○	○/○
Exports RIB files	○	○	○	●	●	●
Batch rendering	○	○	●	●	●	●
Network rendering	○	○	●	●	○	○
Supports a RISC board	○	○	○	●	○	○
30-day money-back guarantee	●	●	●	●	●	○
Toll-free telephone support	●	○	○	●	○	○

● = yes; ○ = no. ¹ Price includes Showplace. ² The next version of Infini-D will include alpha channels. ³ With separate extension program.

grams offer compound surfaces. Sculpt 3D and 4D allow you to combine two procedural textures to create a new surface, whereas Infini-D enables you to combine several layers of procedural and image-file textures. ElectricImage offers advanced capabilities, allowing you to have two texture maps, with accompanying alpha channels, as well as a reflection map for each object in a scene. Furthermore, ElectricImage lets you use alpha channels as a mask to control almost every aspect of surface attributes (such as luminosity, ambience, or reflection).

Rendering Schemes

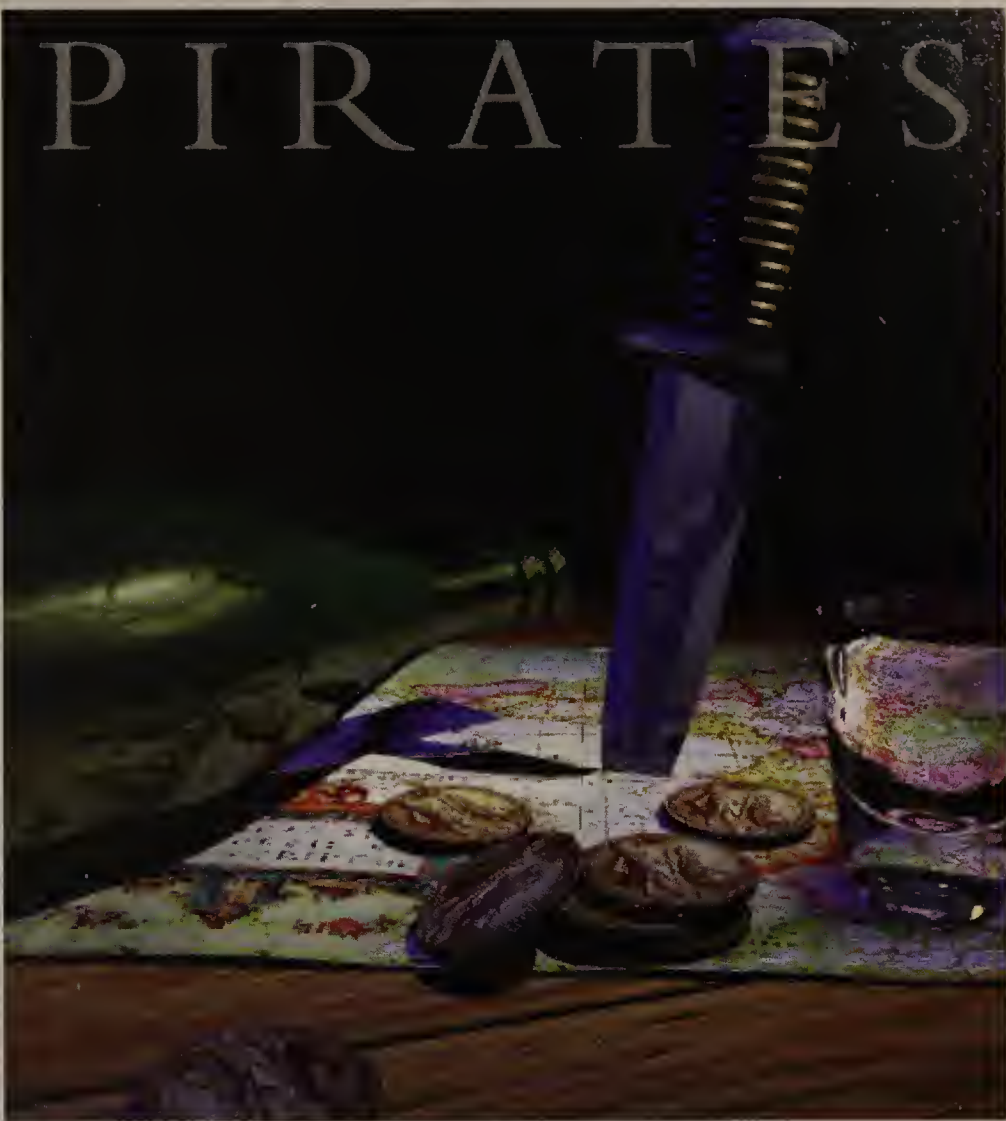
COMPUTERS CAN RENDER 3-D IMAGES VIA PHONG shading, ray tracing, radiosity, or Renderman. Many renderers offer a choice of rendering methods. Phong shading is the quickest method, and all the programs support it. The trade-off, however, is that you can't create procedural textures with Phong shading.

Ray tracing generally creates the most realistic 3-D imagery, but it's also generally the slowest method. That's because ray-tracing programs calculate the reflection of each beam of light off of every object in a scene. You get very realistic images with incredibly detailed reflections and realistic shadows. Unfortunately, the trade-off in rendering time for this realism can be prohibitive for large images or long animations. Ray Dream Designer, Alias Sketch, Presenter Professional, Sculpt 3D, Sculpt 4D, and Stratavision 3D allow you to suspend ray tracing.

Renderman—or MacRenderMan, as the Mac version is called—is a specific type of rendering language created by Pixar. It uses algorithms to create textures, bumps, lights, fog, and practically every other element of an image. Renderman is currently the most widespread rendering scheme—you can render a Renderman file on the Mac and on DOS PCs, Unix workstations, and Next machines.

Presenter Professional 1.1	Ray Dream Designer 2.0	Sculpt 3D/4D	Stratavision 3D
VIDI	Ray Dream	Byte by Byte Corporation	Strata
\$3600	\$895	\$2500/\$3500	\$995
●/●	●/●	○/●	●/●
○	●	●	●
●	●	●	●
●/●	●/●	○/●	●/●
●	●	○	●
○/○	○/○	○/○	●/●
●	●	○	○
●	●	○	●
●	●	●	●
●/●	●/●	●/●	●/●
●	○	○	● ³
●	●	●	●
●	●	○	●
●	○	● ⁴	○
●	●	●	●
○	●	○	○

This feature is in Sculpt 4D only. Sculpt 4D includes animation features.



ROBYN MILLER/CYAN

MacRenderMan provides an extremely sophisticated, and a sometimes difficult, way to generate 3-D images. Since MacRenderMan is a dedicated renderer, it cannot create models. The RIB files that modeling packages produce (and that MacRenderMan uses) vary, so it is sometimes necessary to modify them with a word processor—an involved process. Still, MacRenderMan's quality is top-notch and Pixar's Showplace helps with the modification process, so any problems you run into may be well worth solving.

Radiosity, a relatively unused approach, is currently supported only by Stratavision. (And in fact, radiosity is a proprietary technology—Strata has implemented its own version of this technology, which

Pirates from Stratavision This complex image shows off the results you can get from ray tracing. For instance, the refraction on the shot glass realistically distorts the map image, and the reflections on the knife are highly realistic. Note also that the surface of the coins was created using a bump map.



BRUCE BENNETT

MacTOPAS Piano This photo-realistic image uses a wood-grain texture for the table and cylindrical mapping to wrap the keyboard image around the mug. Transparency mapping was used to create the smoke rising from the mug.

it terms "raydiosity.") Although even slower than ray tracing (some users feel its rendering times are prohibitive), Stratavision's raydiosity feature provides sophisticated characteristics that are unavailable in other renderers. The most notable feature of radiosity is its ability to deal with reflected light rays. For example, if you point a white light at a shiny red sphere, it will reflect that red light onto other objects in the vicinity of the ball.

Speed: The Bottom Line

ASK ARTISTS AND ANIMATORS, "WHAT IS THE worst thing about 3-D graphics?" and they'll tell you that it's the amount of time it takes to render images. It's common for a renderer to take a few hours or more to complete a complex image. Rendering a 30-second animation (requiring 30 images per second) could take three to four months. Hardly a realistic time frame, given that your employer or client will have forgotten who you are by then. Currently, only ElectricImage offers reasonable rendering speed on an ordinary Mac. To speed up other programs, you must use special hardware (see "Faster Rendering").

Why are rendering times so slow? First of all, no Macintosh has the power of a 3-D workstation. Although the Quadra 900 may be able to render images at twice the speed of a Mac II, this is generally not enough of a performance increase to make the Mac a 3-D production system. And while installing an accelerator, such as a 68040-based Radius Rocket, is better than having no accel-erator at all, you are still

far outside the performance range that you need for creating complex work in a short amount of time.

Speed versus Quality

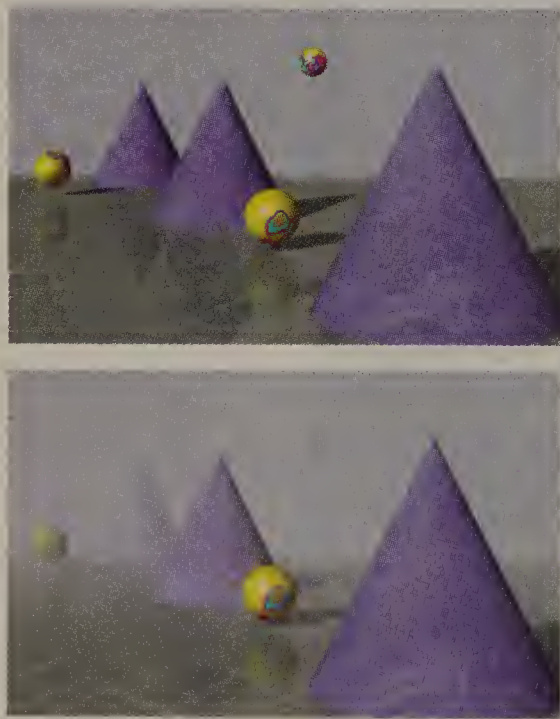
RENDERING SPEED ALONE doesn't tell you which program is the best renderer. You should also look at a program's specific features and the quality of the images it creates. For example, ElectricImage creates extremely-high-quality images. MacTOPAS and MacroMind Three-D also create high-quality images, albeit at slower speeds.

Ray Dream Designer, which is fast for a ray-tracing program, creates images that

are so jaggy that Ray Dream recommends that you run them through its antialiasing utility, JAG. Stratavision and Sculpt 3D and 4D are extremely-high-quality ray-tracing programs, but their rendering times are slow. Luckily, Sculpt 3D and 4D currently provide an option for increasing performance, and Strata is working on a scheme to speed up Stratavision (see "Faster Rendering"). Alias Sketch is a reasonably fast, high-quality renderer for both Phong shading and ray tracing.

Prime Considerations

ALL OF THE RENDERERS CAN CREATE PHOTO-realistic imagery—otherwise they differ greatly in ca-



The Effects of Fog To create fog the user generally defines two points—the point at which the fog starts and the point at which visibility is reduced to zero. Most programs also let you choose the color of the fog. This image was produced in Stratavision, first with no fog (top) and then with the fog setting enabled (bottom).

MW

EDITORS' CHOICE

Under \$1000

MacRenderMan MacRenderMan is an extremely-high-quality renderer and offers a full range of features and special effects. If you use another program as a front end to MacRenderMan, you may never see any of the program's complexity, yet still be able to create high-quality images. Alternatively, you can learn to program MacRenderMan in order to create custom procedural textures. **Company:** Pixar. **List price:** \$795; \$995 with Showplace.

Stratavision Stratavision creates crisp, vibrant images and offers a full array of ray-tracing capabilities. In addition, Stratavision has a huge library of textures. Stratavision's rendering times, which have traditionally been slow, are improved, and Strata has announced a network rendering solution. **Company:** Strata. **List price:** \$995.

Over \$2000

ElectricImage Animation System ElectricImage is a phenomenal rendering program, with the best overall performance. It can create sophisticated surfaces with a variety of special effects. Image quality is extremely impressive, making this program the most intelligent choice for serious animators. **Company:** Electric Image. **List price:** \$7495.

MacTOPAS MacTOPAS is a high-quality Phong-shading program that does a fairly fast job of rendering sophisticated images with textures, reflections, and shadows. The program provides a fairly full set of features in all three key areas—modeling, rendering, and animation. **Company:** AT&T Graphics Software. **List price:** \$7495.


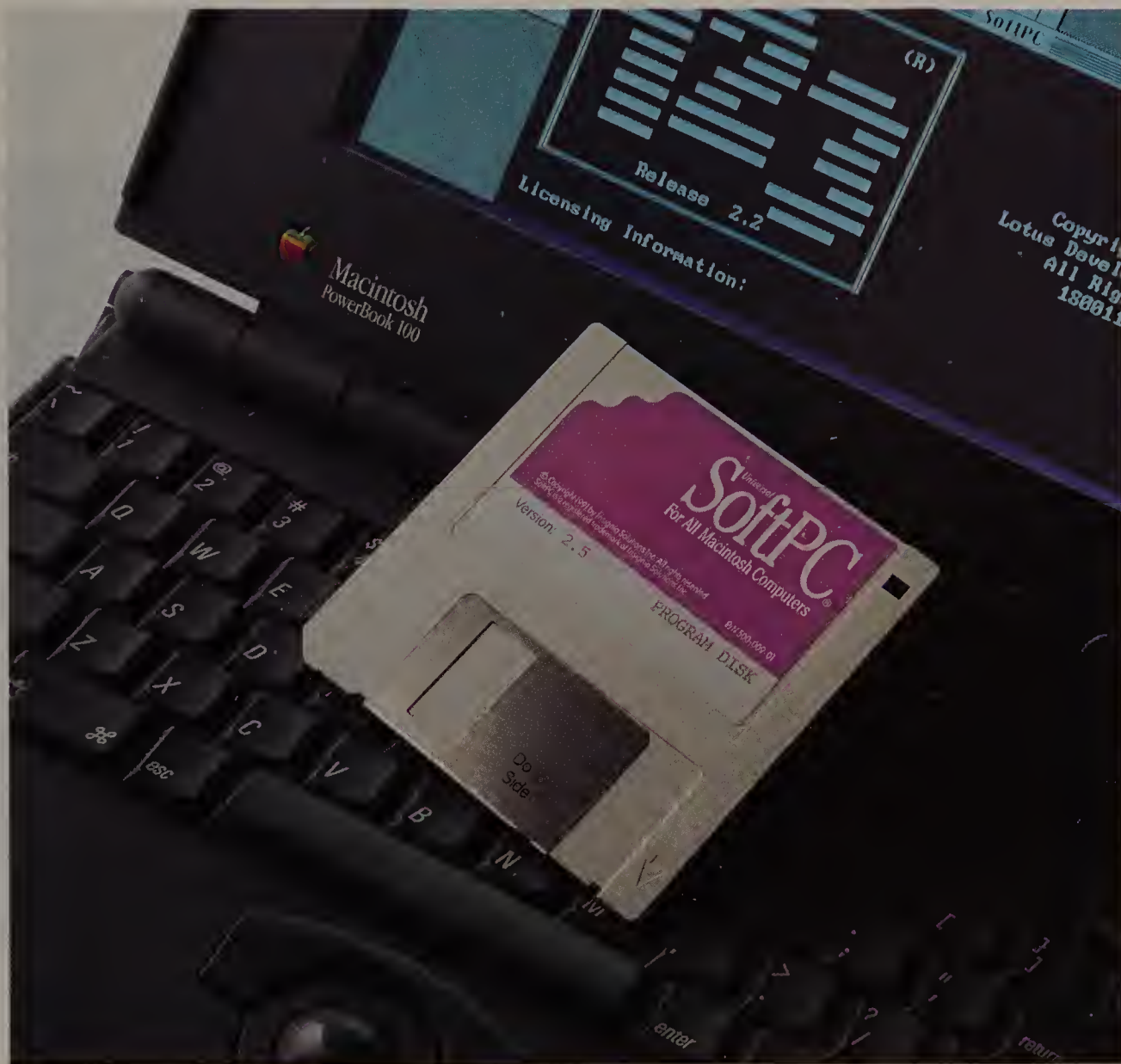
pability. For instance, Infini-D's antialiasing is not as high-quality as that of other programs, and Infini-D does not perform as well as some other programs—but it offers an amazing set of special effects that other programs don't. Some of those effects include sine-wave patterns for creating rippling water, fractal mapping for creating random landscape patterns, and composite surfaces for combining multiple textures. Thus, you may end up buying Infini-D for its effects, and another product for its overall quality.

Keep in mind that rendering is only one part of the 3-D process. Take a look at the modeling and animation programs that work with the renderer. Many professionals take a modular approach, creating models in one program, animating them in another, and rendering them in yet another. If you're truly interested in 3-D, then given the field of modeling, animation, and rendering programs, there's a solution out there for you. **m**

See *Where to Buy* for contact information.

DAVID POOLE is a consultant, animator, and graphic designer for Zen Over Zero in New York City. He has worked as a broadcast TV writer and producer and has been a consultant to ad agencies, video production facilities, and TV broadcasters for Mac graphics and video.

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Reviews

IN THIS ISSUE: Macintosh 16" Color Display, Showplace, Muse, WordScan, ArchiCAD, FreeHand, Expert Color Paint, The Complete Annotated Alice, WordPerfect for the Mac, and more

Color Monitor

Macintosh 16" Color Display

PROS: True-to-life colors; uniform display quality; minimal curvature; built-in ADB connectors.

CONS: Works only with Macs. **COMPANY:** Apple Computer (408/996-1010). **REQUIRES:** Mac IIci, IIsi (with NuBus Adapter Card), or IIfx; Macintosh Display Card 8•24 or 8•24GC.

LIST PRICE: \$1599.



APPLE'S LONG-AWAITED 16-INCH color monitor is something to behold. The Macintosh 16" Color Display is likely to be the standard against which other monitors in this size class are measured, even longtime players like E-Machines and its T16 monitor.

Vivid Display

IN 24-BIT MODE, THE MACINTOSH 16-inch monitor displays colors vividly across the spectrum, producing subtle colors subtly and dynamic colors dynamically. This range diversity means that artists and publishers working with images can confidently predict the results of their color changes based on what they see on the monitor.

Macworld Lab tests do show some strange color falloff patterns. Normally, a monitor shows high falloff as colors get darker. For example, it's typical for a monitor to display 12 percent blue when you specify 15 percent, and to display 6 percent when you specify 10 percent—the darker the color (the lower the



brightness), the greater the difference in what appears. That's because it's hard to control the voltages of the electron beams at such low settings. But the Mac 16-inch monitor sometimes has sharp falloff, then little falloff, and finally sharp falloff as colors get darker. While this odd pattern is noticeable occasionally, most people won't encounter it in normal images.

In addition to very good color range, the Macintosh 16-inch monitor has excellent color uniformity, according to Macworld Lab tests. This means that a color displayed on one part of the screen will be nearly identical to the same color elsewhere on the screen. This may sound like a given, but the physics of the screen phosphors and of the electronic beams that strike and illuminate them result in

differences across the screen unless the electronics controlling the monitor can compensate. The electronics of the Macintosh 16-inch monitor do just that.

The Color Display offers both high brightness and sharp contrast, which on a large monitor is no mean feat. The monitor needs to send a strong enough beam to all areas of the screen to gain high brightness and do so quickly enough to avoid flicker and slow image-refresh rates.

We did notice a slight reddish tinge to the monitor, which we've seen before in monitors using the Sony Trinitron tube (which the Apple monitor uses). Just as different brands of photographic film have different color casts, so do different brands of tubes. You can partially compensate for the reddish tinge by lowering

the contrast and brightness or by using the Monitors control panel to set the gamma (which controls how red, green, and blue are mixed) to Macintosh standard white, which tends to be bluer than paper white gamma or uncorrected white gamma.

The shape of the Trinitron tube makes the screen appear flat, despite a slight side-to-side curve. Flatness is especially important on a larger monitor, since a curve on its broad surface can distort how shapes appear. A rectangle, for example, can easily look bowed on a tube with a significant curve. The Macintosh 16-inch monitor is flat enough that bowing is not a problem.

The Trinitron tube has an aperture pitch of 0.26mm, which is typical of monitors of this size, giving the Macintosh 16" Color Display enough pixels to display images sharply. An 832-by-624-pixel resolution makes the Macintosh 16-inch monitor a 70-dots-per-inch display.

Performance

WE TESTED THE MACINTOSH 16" Color Display on a Quadra 700 with 2MB of video RAM, which let it easily handle 24-bit color at a resolution of 832 pixels by 624 pixels. The Quadra's built-in video was designed to handle large monitors at 24-bit color depth. Our results proved that its screen redraw is speedy in 24-bit color—in fact, speedier than in 8-bit, since the built-in video does not have to map 24-bit colors to 8-bit substitutes.

A sampling of extremely-low-frequency (ELF) radiation emissions show the monitor to be well within the guidelines set by the Swedish government and now used as a de facto standard by monitor manufacturers.

Ergonomics

RECOGNIZING THAT A LARGE MONITOR may be too big to fit on a desk that has a Mac on it already, or too high when placed on top of that Mac, Apple built several ports into the Macintosh 16" Color Display: two sound-in, two sound-out, and three ADB. The inclusion of three ADB ports means you can move the Mac out of the way and still keep the keyboard and mouse accessible. You connect the monitor to the Mac's ADB port through a cable (included with the monitor) and then connect the keyboard and mouse to the monitor. The video cable is long enough to let you move the Mac away from the monitor and the user. The monitor's tilt-and-swivel stand is well designed.

The rest of the controls are characteristic of all of Apple's Macintosh monitors—power, brightness, and contrast. Degaussing (removing built-up magne-

tism, which can affect display quality) happens automatically when you turn on the power. The Color Display comes with no software, instead relying on the System 7 Monitors control panel.

Although touted as having an anti-glare screen, the monitor has noticeable reflection, especially in dark areas. This is an engineering trade-off: the more glare protection added to a monitor, the less sharp the pixels, since the glare coating acts as a distorting lens. Using an OCLI antiglare screen developed by Optical Coating Laboratories would have cut glare without distorting image clarity, but it is expensive, and it cuts brightness considerably. Instead, Apple chose a light, standard coating and let users handle glare by changing lighting conditions.

The monitor's screen is antistatic, fulfilling government regulations in Europe limiting the amount of static electricity that a device may build up. Like ELF emissions, static buildup is an area where some research suggests potential health problems, although there is a great deal of debate over whether, much less at what levels, people should be concerned with ELF and static buildup. A nice side effect is dust won't settle as easily.

Not a Multisync

LIKE ALL OF APPLE'S MAC MONITORS, the Macintosh 16" Color Display works only with Macs. You cannot use it in a mixed environment of DOS, Unix, and Mac computers. For many users this is no loss. Others should look at vendors (like NEC, Ikegami, and Sony) that support multiple platforms with one device.

The Macintosh 16-inch monitor is also limited to one resolution—832 by 624 pixels—despite the trend toward monitors that can display images at several resolutions (typically 640 by 480, 832 by 624, and 1024 by 768) no matter what the screen size, in effect providing a zoom feature without losing detail.

This lack of multisync capability is why the Color Display has no options for repositioning the screen image. Multisync monitors have such controls because an image might be off-center after switching between resolutions or computers.

A Quality Product

APPLE HAS A HIGH-QUALITY MONITOR in its 16-inch Color Display, legitimizing this new class of monitor size and setting a standard for its competitors. While others entering the market will stress features like multisync, color balancing, and software controls, monitor makers will be hard put to surpass the quality of the Macintosh 16-inch monitor's screen display.

—GALEN GRUMAN AND TIM WARNER

Rendering Program

Showplace 1.1

PROS: Straightforward interface; fine collection of objects and textures; produces predictable results; includes MacRenderMan for photo-realistic rendering; both applications support background processing.

CONS: Cannot align objects to each other or select random surfaces within an object; nonintuitive rendering scheme. **COMPANY:** Pixar (510/236-4000).

REQUIRES: Mac with math coprocessor; 5MB of RAM; color monitor; System 6.0.3; 32-bit QuickDraw. Recommended: 8MB of RAM; 24-bit video board; 3-D modeling program. **LIST PRICE:** \$995.



NO ONE CAN DISPUTE PIXAR'S CONTRIBUTIONS to the world of photo-realistic computer graphics. The company's award-winning shorts (*Luxo Jr.*, *Tin Toy*) and ground-breaking television commercials (Lifesavers, Listerine) earned Pixar its reputation as a pioneer in the field. Also notable is Pixar's RenderMan Interface ByteStream (RIB) format, which has facilitated compatibility between software from different developers. The water monster from *The Abyss* and the liquid-steel effects from *Terminator II*, for example, while not rendered on a Macintosh, demonstrate the potential of the RIB format.

One of the few problems in this leader-of-the-pack scenario has been MacRenderMan, Pixar's shading and rendering software. True, you can render professional-quality images from MacRenderMan as easily—though certainly not as quickly—as printing a page from a word processor. However, the program supplies no graphical interface to apply any of the program's lighting and shading effects; you must resort to a module that is little more than a front end for a complex programming language.

That's where Showplace comes in. Recently upgraded to version 1.1, Showplace is a straightforward graphics application that organizes the process of shading and rendering into five basic components—importing and manipulating objects, applying surface detail, selecting and placing light sources, positioning the camera, and rendering the final scene. The effect is rather like having a small photographer's studio right inside your monitor.

Assembling the Pieces

SHOWPLACE IS NEITHER A MODELER nor an animation program; its purpose is to render still scenes within a specified

continues

frame size. To assemble such a scene, you can import one or more objects stored in the RIB format. Showplace provides a starter library of 42 ClipObjects, ranging from simple discs and spheres to full-blown images, but you'll find yourself either purchasing additional ClipObject libraries or using a modeling application to create your own. If modeling isn't your strong point, you can purchase additional ClipObjects libraries from third-party developers, including Acme Animation Group (Emerson, NJ; 201/261-5977), Acuris (Palo Alto, CA; 415/329-1920), and the Valis Group (Point Richmond, CA; 510/236-4124).

Once you've imported an object, you position it relative to other objects in the current scene, resizing and rotating it as you want. All objects in the ClipObjects starter library are scaled accurately with respect to one another, so you should import all the objects you plan to use before resizing any of them.

With every scene, Showplace provides a reference plane that serves as a grid for your creations. You can align the width, height, or depth of one or more selected objects to the plane. Because Showplace always aligns the exact center of an object to the center of a plane, you can align only one side of a selection at a time. You can't align objects with respect to each other, either—a major drawback, in my book.

Computer Detailing

TO APPLY TEXTURES TO AN OBJECT, you select the portion of the object that you want to affect, then select a texture from the Looks library. Unfortunately, this is the only instance in which you can select one detail in an object separately from the rest of the object. Even then, the details are predefined by whatever modeling application was used to create the object; if the two wheels of a bicycle have been assigned to the same surface group in Swivel 3D, for example, you cannot apply a different texture to each wheel with Showplace.

You can modify the color and luster of many textures after their application, or use the LabelMaker utility to create your own Looks. The upgraded LabelMaker 1.1 allows you to bevel fonts (similar to carving characters' edges) to create 3-D logos and other special text effects. For example, by making the white portions of a label transparent, you create a decal, which is useful for making emblems that appear painted or etched onto other surfaces. When you label an object, however, you replace the previous texture, so if you want to apply a decal over an existing surface (as demonstrated by the sun symbol in "Stargazing"), you have to import

a flat object such as a disc, position the disc over the textured object, and apply the decal to the disc.

Lights, Camera, Ad Infinitum

LIGHTING IS ONE OF THE PROGRAM'S most satisfying features. You can choose from four kinds of lighting: unfocused ambient light, distant parallel light (as from the sun), point light (as from a light bulb), and focused spotlight. You can create as many lights as you want, and each may be of a different color; you can also position and orient lights at precise x -, y -, and z -coordinates throughout your graphic. Best of all, a light can affect all objects that surround it, or it can dissipate gradually, as in real life.

You define the field of view using Showplace's camera tools. Each tool allows you to change the position of the camera (that is, the viewer) and that of the "lookat point," which represents the exact center of the area seen by the camera. This distinction can be confusing at first, but becomes extremely useful once you're up and running with the program. For



Stargazing Using a Mac IIci equipped with 20MB of RAM, this image was rendered from Showplace 1.1 over the course of 13 hours.

example, you can instruct the camera to look at a selected object, then move the camera so that you're viewing the object from an entirely new angle. If you think you'll want to revisit a view, you can save the camera position with the current file. After a while, you'll find yourself moving the camera regularly to examine all angles of your scene.

Rendering is Showplace's most powerful but least intuitive feature. The program relies on a draft-quality renderer, which is satisfactory when rendering to videotape, but otherwise only fit for proofing purposes. If you intend to output the final scene to a high-resolution imagesetter or film recorder, you need to install the photo-realistic rendering module included with MacRenderMan. To

specify which rendering module you want to use, you have to select it from the Chooser, not a step normally associated with rendering a file to disk. A single set of rendering preferences controls all rendering, whether you're creating a final image or merely previewing the objects on screen. It's not uncommon, therefore, to specify a low-quality screen preview while rendering to the screen, then forget to change the setting before rendering the final image. Since even low-resolution images can take an hour or more to render, you waste valuable time before you notice your mistake. You also have to take into consideration the amount of time it takes Showplace to write to disk enormous lighting and texture files to calculate the appearance of shadows and other memory-intensive elements. (Showplace required 39MB of disk space to render the stage image shown in "Stargazing.")

On the upside, both Showplace and MacRenderMan make use of the Render-Monitor application, which renders scenes in the background. Over the course of several days of rendering various images

in the background, I encountered no system errors or sluggish performance while working in the foreground application. Once, Render-Monitor canceled a project because it ran out of disk space, but it saved the portion of the scene it had rendered up to that point. This allowed me to reconfigure Showplace to render the scene from that point on, thereby minimizing time loss.

Showplace's simplified interface is ideal for beginners; you need only learn a small set of tools and commands to begin rendering in earnest. The program also meets the needs

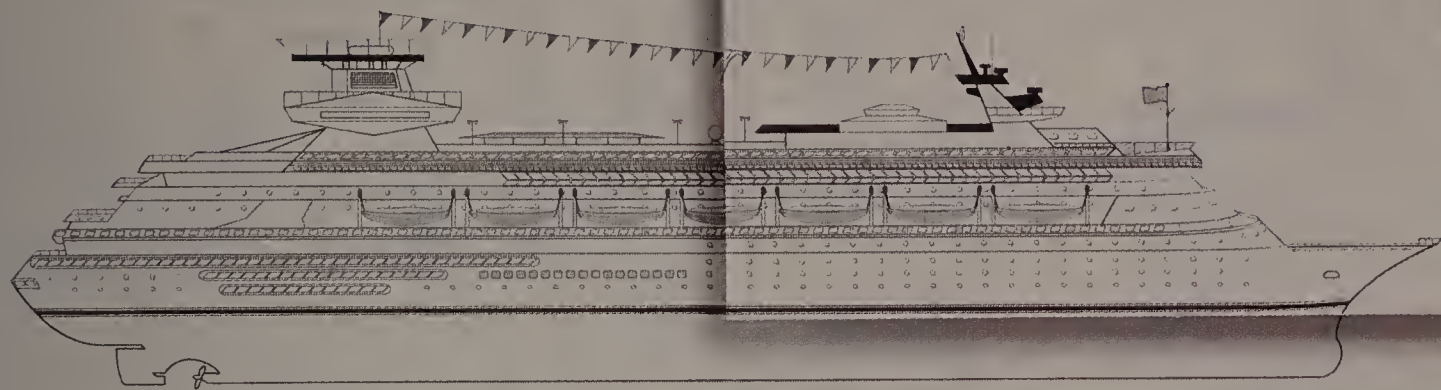
of intermediate users by providing a library of objects and surface textures that can be mixed and matched.

If you have used other modeling and rendering applications, you may find Showplace's feature set too small. Of course, you can always switch over to the more powerful MacRenderMan as your requirements expand, but I can't imagine many users wanting to make the leap from Showplace to the minimalist, nuts-and-bolts interface of MacRenderMan.

So, while Showplace presents a rare opportunity for the entry-level user to jump into the world of 3-D programs, I expect that a more powerful version will be necessary to make a dent in the Macintosh computer graphics market.

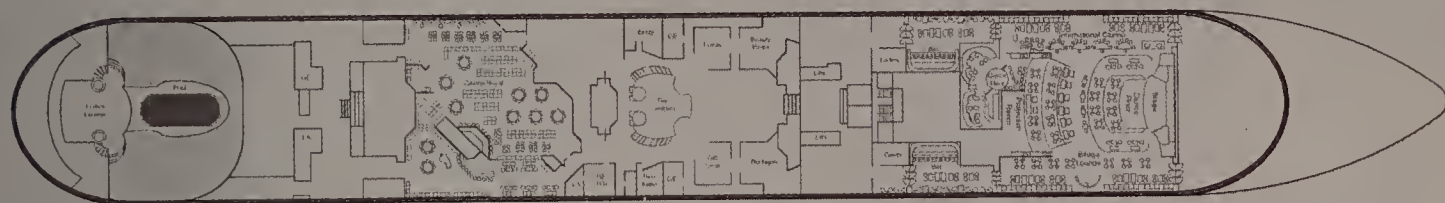
—DEKE MCCLELLAND

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Gofer 2.0

PROS: Extensive text search options; doesn't require indexing. **CONS:** Slow; can only view files; can't search by file name. **COMPANY:** Microlytics (716/248-9150). **REQUIRES:** Mac 512KE. **LIST PRICE:** \$79.95.



On Location 2.0.1

PROS: Fast; displays formatted files; indexes in background. **CONS:** Takes time to index; can't exclude search strings; can't use wild-card characters. **COMPANY:** On Technology (617/876-0900). **REQUIRES:** Mac Plus; System 6.0.4. **LIST PRICE:** \$129.95.



AN OLD COLLEGE PROFESSOR OF mine liked to snap his fingers to show us how fast our brain cells were dying. Well, whether it's because my brain is shrinking or the data on my hard drive is expanding, I do seem to have more trouble keeping track of my files these days. But where there's a need, there's a utility, or in this case, two utilities.

Gofer

GOFER IS BEGINNING TO LOOK A little long in the tooth, even in its second incarnation. A desk accessory, Gofer scans a hard drive by looking for files that contain designated text—you can't search for files by name, and you can view files only as plain text. Text can be transferred to the Clipboard, and a handy feature lets you copy noncontiguous selections.

Gofer's search functions are more than flexible enough for most users. You can locate files that contain *Tom* or *Dick* but not *Harry*, for example. You can even tell Gofer how many lines separate two text strings you're looking for. An asterisk (*) acts as a wild card for any character, and a pound sign (#) substitutes for any digit.

Gofer can search for text in most Mac file types, and volumes don't have to be preindexed. Unfortunately, you pay a price for convenience: Gofer is relatively poky, even on a fast hard drive. Gofer wastes time by continuing to process files after the search text has been found—there should be a way to stop the search after you have found the text you want. Although you can speed things up by limiting searches to specific folders, that's not much consolation if you don't know where to begin looking.

On Location

THE NEWEST VERSION OF ON LOCATION adds several useful features to an already-popular utility. Now you can perform multiword searches, and you can specify if all of the words have to be in the file, or if any one word will do. Wild-card characters still aren't allowed, though you can scan by word root if you're unsure of spelling. Although On Technology claims that most people don't need the extensive Boolean options such as those Gofer offers, I would like to be able to exclude files containing specific text strings. The algorithm used for searching also isn't perfect—rarely, On Location finds a document without any true word matches, and only when you try to view the file does it tell you that word is not in the file.

Unlike Gofer, On Location can scan file names as well as embedded text, and you can delete, copy, move, or rename files. Documents can be displayed with styling intact if the appropriate XTND translator file is in the System Folder. (On Location ships with 11 XTND filters.) On Location also lets you open or print a document if you have the application that created it.

On Location's greatest advantage is speed: when you search by name, new files pop up almost as fast as you can type. Text searches are slower but still leave Gofer in the dust. In one test, On Location took 33 seconds to scan 689 files for my last name, compared with Gofer's 9 minutes. The key to On Location's performance is precompiled indexes, which you have to create for each volume you want to search. The indexes are fairly compact, usually occupying less than 3 percent of the files indexed. If storage is tight, you can save space by excluding specific file types or numbers from the index.

Indexing a large volume can take hours, though. Occasionally, On Location freezes while it's generating an index, forcing you to remove the problem document and start again. (After four frustrating attempts at indexing my hard drive, I disabled nonessential INITs.)

On Location keeps up with changes to your files by updating indexes in the background. You can vary the frequency of automatic indexing, or you can eliminate it entirely if it bothers you. Over many months of testing, On Location's background processing was never obtrusive.

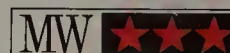
Unlike the tortoise's steady pace, speed makes On Location the undisputed winner in this race. It's ideal for keeping tabs on huge volumes like CD ROMs, and the ability to view formatted text is a plus. On Location is one of the few utilities I wouldn't want to be without.

—FRANKLIN N. TESSLER

Input Devices

MouseMan

PROS: Comfortable shape; three programmable buttons; click-lock feature enables precise movement. **CONS:** Takes some getting used to; three-button advantage sometimes moot. **COMPANY:** Logitech (510/795-8500). **REQUIRES:** Any Mac with ADB port; System 6.0. **LIST PRICE:** \$119.



TrackMan

PROS: Three programmable buttons plus trackball; click-lock feature enables precise movement. **CONS:** Right-hand bias; can be uncomfortable with extended use. **COMPANY:** Logitech (510/795-8500). **REQUIRES:** Any Mac with ADB port; System 6.0. **LIST PRICE:** \$139.

A³ Mouse

PROS: Smooth ride; high resolution; ships with Nu-Paint DA. **CONS:** Murky software and documentation; compatibility problems. **COMPANY:** Mouse Systems Corporation (510/656-1117). **REQUIRES:** Any Mac with ADB port. **LIST PRICE:** \$149.95.



ADAPTING TO AN UNFAMILIAR pointing device can take time. For some users and some applications, the comfort of a trackball or the benefits of a mouse with multiple buttons easily outweighs the initial burden of learning something new. Logitech's MouseMan and TrackMan, and Mouse Systems' A³ Mouse combine programmability with ergonomic design to provide alternatives to Apple's standard mouse.

MouseMan and TrackMan

OF THE THREE, THE BEAR-PAW-SHAPE MouseMan is my favorite. It's handsome and solidly made, with a rounded back and convex top that make it comfortable to hold, although my lab assistant Igor (with hands the size of catchers' mitts) and I (with my very small hands) both wished it were a bit smaller. The MouseMan's three buttons are responsive and produce an audible click, so you always know when you've touched off a mouse event. The center button is dimpled to orient your fingers, though a little more tactile differentiation between buttons wouldn't hurt. Logitech thoughtfully offers both a right-hander's and a left-hander's mouse. The MouseMan also has ADB throughput, so

continues

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At the heart of the BLP Elite is the most compact, cost-effective PostScript controller board ever designed. A compact controller means two things: fewer components and lower manufacturing costs, which translates to exceptional product reliability and a significant cost savings for you.

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End user's circle 221 on reader service card

Dealers circle 212 on reader service card

22006H



Left to right: Logitech's MouseMan, TrackMan, and the Mouse Systems A³ Mouse.

it's possible to have two devices plugged in at once—a mouse plus a trackball, say, or graphics tablet.

The Logitech TrackMan, like the MouseMan, has a convex top, a dimple on the center button, and ADB throughput. It's about the size of your average sandwich. When oriented for right-handed use, the three buttons sit on the TrackMan's front-right edge, and the small trackball lines up under the first joint of your thumb. Logitech suggests that left-handed users rotate the unit, but that really does not compensate for the fact that the TrackMan is not laid out for southpaws.

I found the TrackMan less satisfactory than the MouseMan. The ball itself felt too small, too light, and too glossy to provide adequate kinesthetic feedback. My thumb tended to slide over the surface of the ball instead of moving it.

Both Logitech units gain functionality from the MouseKey control panel (cdev for systems before 7.0), which replaces Apple's Mouse cdev. You can assign key combinations to the three buttons so that they act like function keys, even if you do not have an extended keyboard. Alternatively, these buttons can mimic standard mouse events: double-click, triple-click, and the admirable click-lock. The last is especially useful for click-and-drag maneuvers, allowing you to concentrate on precise motions instead of downward pressure; it also eases the strain on your hands and wrists. With both Logitech devices, I eventually settled on single-click, double-click, and click-lock for the three buttons, but you're not limited to one set of choices. The Logitech software lets you customize the buttons for every program you use.

The A³ Optical Mouse

MOUSE SYSTEMS' A³ OPTICAL MOUSE gives the smooth ride and tight resolution characteristic of optical devices, and has three light-touch keys at the front edge of its squarish casing. Strong software would make the A³ Mouse an attractive package.

Unfortunately, the A³'s software limits you to keyboard commands; you can't assign mouse-click variations to the extra buttons. Thus, for example, you could assign ⌘-0 to one button for opening folders and files, but you'd have to highlight the icon first with a single click.

Moreover, the A³ is incompatible with some very common commercial INITs. The software turned off both After Dark and Adobe Type Manager on my SE running System 7. Mouse Systems' technical support claimed that moving A³'s control panel to the System Extension file would cure this, but it didn't. Reshuffling and reconfiguring my other INITs didn't help either. The A³ also ships with NuPaint, a paint desk accessory that also evinced compatibility problems.

What's Your Pointer?

THE REASON FOR ALL THE VARIETIES of input devices is to provide comfortable, efficient ways for people's hands to communicate with computers, so that people can work (or play) with minimum risk of repetitive strain injuries. The only sure way to avoid computer-related hand injuries is to take periodic breaks. The only sure way to find the best input device for you is to experiment. See if a trackball (large or small) works for you, check out the software, and decide whether programmable buttons make a positive difference in the way you work. And avoid buying a pointer you can't return. You may not find out that you and your new HyperTurboRodent don't get along until you've been acquainted a week or three.—TERESA NIELSEN HAYDEN

Data-Analysis Software

Muse 1.0

PROS: Innovative approach to organizing and reporting data; free-form query language; carries units and scale with data items. **CONS:** Conceptually demanding; output is limited to spreadsheets and graphs (no reports); limited graphics and analysis capabilities; error messages unhelpful. **COMPANY:** Occam Research Corporation (617/923-3545). **REQUIRES:** Mac II; 5MB of RAM; System 6.0.5; hard drive with 10MB of free space. Recommended: Math coprocessor; System 7. **LIST PRICE:** \$695.



MOST BUSINESS ANALYSES ARE not difficult to carry out or understand. Often, though, the process of finding and assembling the required data is a lot of work and error-prone besides. Moreover, it's often hard to extract exactly what you need because a single datum is

located at the intersection of many dimensions. For example, your current salary is located by at least three indicators: who you are, what point in time is of interest (current), and what data item is wanted (salary). Wouldn't it be useful to have a program that lets you specify data extraction, analysis, and display, and enables you to do so in a natural, interactive way?

Muse is such a program—almost. It is based on a large, ambitious vision of how to organize and use data. It has relational databases, called DataBooks, from which you extract the data of interest. It has spreadsheets, called WorkBooks, in which the data are presented and analyzed. And it has graphs for presenting data visually. Underlying all of this is a dictionary-based, syntax-driven query language around which all Muse activities revolve. The language is enough like English to fool you, at least for a little while. English or not, it should be easy enough to learn how to request simple analyses.

Scaling, Scaling

MUSE OFFERS A UNIQUE AND POWERFUL combination of several capabilities not available in other data-analysis programs. Muse keeps units and scaling with each data item and understands how to use them. For example, the query six feet by eight inches returns 5 square feet. Typing \$123 thousand in French francs yields 700,854.70 French francs (Muse understands the word *thousand*). Data can be indexed by up to eight indicators (keys). Spreadsheets are organized not only in rows and columns, but also in pages and chapters, making them capable of displaying data indexed by all eight keys. Muse smoothly changes views for you when you display with different keys (see "Comparing Apples and Oranges"). This capability alone is worth the price of the package.

Muse can have up to 15 DataBooks open at once, and it automatically establishes relational links among variables that have the same name and definition (you provide the names and definitions when loading the data). If the name is the same but the definition is different, a dialog box asks you if you want to link the variables anyway. For example, the definition of *fiscal year* might be different for two companies being compared. You can also link variables manually. Each DataBook can include one script as well, so that specialized analyses, unit conversions, and so forth can travel with the data to which they refer.

Data can be entered from many external sources into a DataBook. Occam Research recommends loading data into a Workbook first and reorganizing them

continues

IF YOU DON'T HAVE THE PLP II, YOU'LL NEED SPECIAL EQUIPMENT TO GET EDGE-TO-EDGE PRINTING.



If you want a printer that's a cut above the competition, look no further than the \$949 Personal Laser-Printer™ II (PLP™ II) from GCC Technologies®. GCC's exclusive edge-to-edge printing

gives you the power to produce larger graphics, flow charts, and much more. With other printers, like the Apple® Personal LaserWriter® LS, you're forced to cope with margins that confine your graphics and narrow your options.

Edge-to-edge printing is just one of the features that set the PLP II apart from the pack. Other features include:

- **PostScript upgrade.** Provides an upgrade path to PostScript® and AppleTalk® networking.
- **Greater scaling capabilities.** Scales from 25% to 400% in 1% increments, compared with the Personal LaserWriter LS, which is limited to 50% and 75%.
- **Straight-through paper path.** Ensures wrinkle-free printing of heavy stocks, envelopes, labels, etc.
- **New! Background printing.** Lets you get back to work on your computer faster, and allows sharing using AppleShare® with System 7.0.

- **Faster print time.** Prints faster than the Personal LaserWriter LS. In fact, *MacUser* (May 1991) found the PLP II to be 20% faster than the Apple Personal LaserWriter LS on their Microsoft® Word test document, 40% faster on their MacDraw® II test, and twice as fast on their Excel test.

- **On-screen page preview.** Saves time, toner and paper.

Of course, the PLP II also features the unmatched reliability and innovation that go hand-in-hand with the GCC Technologies name. It's the name to count on when you're looking for a high-quality, affordable laser printer. And there's no margin for error.

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there, then saving them to their final destination. Muse supports WKS, WK1, DBF, DIF, and SYLK formats, along with tab- or comma-delimited text, and fixed-field data. The documentation is thorough and clear about how best to organize data into an optimal form for flexible access. Files can also be imported directly from a flat-file database into a databook.

Putting It Out

OUTPUT FROM MUSE IS LIMITED TO spreadsheets and graphs. This is fine if you're giving a presentation to the boss, but generating written reports requires a lot of cutting and pasting. Conventional database applications support mail merge-like output such as "Dear Mr. XXXXX. We notice that your YYYYY invoice for ZZZZZ is WWW months overdue..." Muse has nothing like this. Its graphics are flexible but limited. If two- and three-dimensional bar charts aren't enough, you can animate a 3-D chart to give it a fourth dimension. You can change colors, fonts, backgrounds, and axes to your heart's content—you can even change the perspective on 3-D plots. In the end, though, only the usual business-type graphics are supported: bar, column, and pie charts, as well as scatterplots and x - y graphs. In general they're showy but not very informative.

Muse support sophisticated analyses such as time series projections. It concentrates instead on calculating factors such as sales by region, and yield per unit of raw material. Given its extensive library of scientific constants, units, and functions, you'd think Muse would be useful in the laboratory, but it has no scientific analyses such as curve fitting. Nor does it support any technical graphics such as true contour plots and histograms; it supports only linear and log scatterplots and line

graphs. Muse's units and scaling functions are confusing as well as useful. A request for one century in days returns Units Conflict. Yes, it's true that this century has 36,524 days and the next one will have 36,525, but give me a break—this could be a useful conversion. At least give the user a hint as to the problem. Muse also attempts to handle the delicate question of significant figures, and the result is mixed. Typically, returned answers have far too many significant digits given the precision of the question.

My biggest concern is the language interface. Muse's queries—its programming language—are deceptively easy to misread as English. It's much harder to write correct queries than it appears to be. Most amateur attempts result in diagnostic messages such as 'What' cannot begin a sentence, right after five successful questions beginning with What. More pernicious, though, are the improperly framed questions that do get answered. Buried in the back of the reference manual are all the rules for precedence of operators and parsing sequences, but it takes experience to know how to interpret and use them. Any programmer knows that understanding these rules is crucial for getting the right answer. Do I read $5 * 6 + 4$ as $(5 * 6) + 4$, which equals 34, or as $5 * (6 + 4)$, which equals 50? Muse's tutorial teaches by example, and the reference material clearly explains a few ways to avoid going wrong, but it's not enough. Nonprogrammers will either plow ahead and make some unseen mistakes or bog down and give up. Don't misunderstand—this is a major issue for anyone who deals with natural language, but it's still a problem.

Muse's extensive documentation is well written and helpful, if a bit tedious and repetitious. The program makes use of System 7 balloon help and includes a nice elementary tutorial. What's missing is a large example that a student can work through from data loading through final output. In a product of this scope and complexity, this is essential.

I found a few bugs and Mac interface anomalies. The zoom box fills all possible monitors in a multiscreen Mac II setup; it should fill just the currently active one. Multiple selection in scrolling lists is done by dragging, not shift-clicking, and there's no Select All function. To restore a deleted data entry, you press the escape key, but if you clear a cell using ⌘-B , you use ⌘-Z to undo.

If You've Got a Niche

OVERALL, I'M VERY IMPRESSED BY THE scope and ambition of Muse, and it clearly fills a niche not currently addressed. It's an excellent environment for certain kinds of

data handling—for example, if you want to analyze your little corner of an enormous corporate database. As the product and its user base mature, Muse should realize its potential.—PHILIP STEIN

Educational Games

Number Munchers 1.1

PROS: Combines arcade excitement with learning; outstanding color graphics. **CONS:** Repetitive cartoon sequences; no mechanism for creating custom word lists. **COMPANY:** MECC (612/569-1500). **REQUIRES:** Mac Plus; System 6.0.2. **LIST PRICE:** \$49.95; with teacher materials \$69; five-pack \$149; network license \$399.



Super Munchers 1.0

PROS: Combines arcade excitement with learning; outstanding color graphics. **CONS:** No mechanism for creating custom word lists. **COMPANY:** MECC (612/569-1500). **REQUIRES:** Mac Plus; System 6.0.2. **LIST PRICE:** \$49.95.



Word Munchers 1.0

PROS: Combines arcade excitement with learning; outstanding color graphics and digitized voice cues. **CONS:** Repetitive cartoon sequences. **COMPANY:** MECC (612/569-1500). **REQUIRES:** Mac Plus; System 6.0.2. **LIST PRICE:** \$49.95; with teacher materials \$69; five-pack \$149; network license \$399.



"I'D PLAY IT TILL MY EYES FELL OUT (if I could)." —Andy, age 10. Andy's not talking about playing a take-no-prisoners shoot-'em-up at the local arcade but Number Munchers, an educational game designed to build arithmetic skills. Number Munchers is one of a trio of programs that combine the thrill of arcade action with solid educational principles. The result: everybody wins.

Number Munchers

IN NUMBER MUNCHERS, THE PLAYER maneuvers a cartoon Muncher around a matrix game board, finding and gobbling up numbers. In a typical game the player's job is to navigate the Muncher to each multiple of four so it can eat the number. Correctly chomped numbers earn points; incorrect bites wipe out the Muncher. Each game begins with four Munchers and ends when all four are gone.

To make things more interesting, evil *continues*

The screenshot shows two windows of the MUSE Workbook 2 application. The top window displays a table with columns for Fiscal Year, Country, Fruit Type, and Sales. The bottom window shows a zoomed-in view of the same data, highlighting the 'United States' and 'Apple' data for the year 1986.

		Juice Sales		Pulp Sales	
		Apple	Orange	Apple	Orange
United States	1986	\$4,680,007.00	\$4,062,525.00	\$234,000.00	\$162,501.00
	1987	\$5,240,399.00	\$4,184,447.00	\$261,225.00	\$166,445.00
	1988	\$6,419,488.00	\$4,435,513.00	\$305,447.00	\$172,554.00

Comparing Apples and Oranges These Muse WorkBooks show two ways financial data can be indexed by four keys: Sales of Juice or Pulp, Fruit Type, Fiscal Year, and Country. You can rearrange the rows and columns, and Muse automatically restructures the data. Note that the row labels for Fiscal Year are repeated for each type of sales.

**If you said
you could buy
an 040 upgrade
for under \$1500,
people would
call you crazy.**

Troggles (which look like "Muppet Show" extras) wander across the grid, changing numbers and gobbling up any Munchers they encounter. As the game progresses, Troggles become more abundant and troublesome. Experienced players take advantage of the Time Out button to plan strategies and do calculations when Troggle activity gets too intense.

For every three levels completed, the player is rewarded with a short cartoon depicting a clever Muncher confronting a frustrated Troggle.

Word Munchers

WORD MUNCHERS IS ESSENTIALLY the same game, but the Muncher's job is to eat words with vowel sounds that match the target sound. For example, if the message says "u as in huge," the Muncher gets points for eating *cube*, *feud*, and *spew*, but loses big if he tries to eat *truck*. Players who have trouble reading the word can use the Hear Vowel command to hear a digitized voice pronounce the sound; there's no option for pronouncing the words in the grid, though.

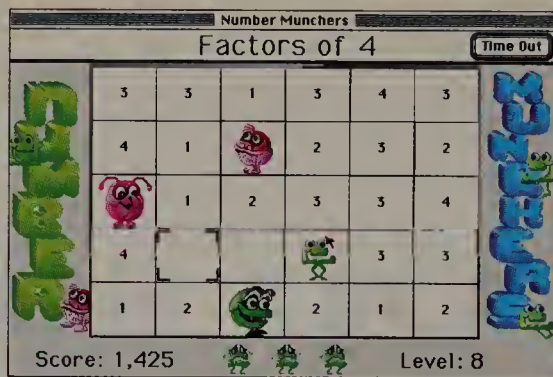
Super Munchers

FROM A KID'S POINT OF VIEW, SUPER Munchers has a longer-lasting appeal than the two other Muncher games. It's targeted for the home market, and the game titles sound like categories on a TV quiz show: Animals, Famous Americans, Food and Health, Geography, Music, Odds 'n' Ends, and Challenge. A word or phrase at the top of each screen represents a "target rule," such as European countries, romantic composers, and animals with an exoskeleton. The Muncher is supposed to swallow words conforming to that rule.

Most of all, kids like the arcade extras, new to Super Munchers. Get 20 consecutive correct answers, and a Transformation Cell temporarily turns a Muncher into a Super Muncher capable of clobbering Troggles and peeking at correct answers. And for every three levels completed Super Munchers rewards the player with one of five interactive minigames ranging from simple logic games to fast-paced arcade games.

Food for Thought

ALL THREE GAMES CONTAIN password-protected Management menus that allow parents and teachers to control the curriculum. Word Munchers lets you specify the difficulty level (from grade 1 to grade 5+) and choose any or all of 20 distinct vowel sounds. Number Munchers can be set up to ask for multiples, factors, primes, equalities, and inequalities; each of these categories can be fine-tuned. You can also choose a predetermined curricu-



Troggle Trouble Troggles roam the screen, changing numbers and gobbling up nearby munchers (and other Troggles).

lum based on grade level, from 1 to 8+. Similarly, Super Munchers allows you to individually turn off selected games, rules, levels, and options; it also lets you choose a Quick Set option, from Grades 3-4 to Ultimate. Unfortunately, none of the programs accept custom data sets.

All in all, my testing crew loved these games, especially Super Munchers. The games are available in lab packs, complete with teacher guidelines, and Network menu options permit management from one central Mac.

The Munchers are no threat to Super Mario Bros., but even kids recognize that the Muncher trilogy offers more than just arcade fun.—GEORGE BEEKMAN AND THE SHOO-BEDOOBOP SOFTWARE TESTING TEAM

OCR Programs

Wordscan 1.0 Wordscan Plus 1.0

PROS: Read any font accurately with little setup; recognize dot matrix characters; highlight errors in text editor; support PICT and TIFF file formats generated by scanner or fax modem. **CONS:** Idiosyncratic interface; incompatible with some hardware and system functions. **COMPANY:** Calera Recognition Systems (408/720-8300). **REQUIRES:** Mac Plus; 3MB of RAM; hard drive. **LIST PRICE:** WordScan \$495; WordScan Plus \$895.



ALERA'S TOPSCAN OPTICAL CHARACTER recognition (OCR) system has been widely praised for speed and accuracy, but its price tag (approximately \$20,000) limits its user base to corporations and a few prosperous service bureaus. Calera now addresses the needs of us mere Mac mortals with two software-only products, WordScan and WordScan Plus. Both provide scanning and text-recognition options that easily put them in a league with the current OCR champs, Xerox Imaging Systems' AccuText and Caere's OmniPage (see "OCR: Teaching

Your Mac to Read," *Macworld*, November 1991). WordScan Plus goes a few steps further, adding style sheets, a pop-up window to compare a word to what was originally scanned, and a feature that automatically identifies graphics on a scanned page and saves them to separate files. Throw in user-definable dictionaries, support for deferred processing (scanning pages, then running the OCR software later), and the ability to jump from one questionably recognized word to the next inside the text editor—features found in WordScan and WordScan Plus—and you're looking at two of the finest OCR programs for the Macintosh.

Lean and Mean

THE BEST THING ABOUT WORDSCAN (I am using the product name to include both WordScan and WordScan Plus) is the degree of automation it offers. In addition to the ability to read virtually any typeface, including draft-quality dot matrix text—an attribute equaled only by OmniPage and AccuText—WordScan can automatically subdivide a page into the appropriate number of columns. In OmniPage and AccuText, you have to either specify the number of columns prior to recognizing a page, or preview a scanned page and determine the boundaries of each text block. In WordScan, previewing is necessary only when you want to isolate a specific area of a scanned page, such as a single story on the front page of a newspaper. The program automatically reads through each column and displays a progress window to let you know what percentage it has recognized. WordScan Plus allows you to manually select and link columns, but this laborious process is rarely necessary.

While OmniPage and AccuText are commendably accurate text readers, you must fool around with brightness and contrast settings to yield the most favorable results. WordScan is the only OCR program I've used that lets you sit down and immediately begin scanning. Without any scanner adjustment whatsoever, WordScan consistently performed better than either of its competitors (though, with sufficient effort, OmniPage and AccuText can be made to read as well as or better than WordScan). As with the Macintosh itself, you just plug WordScan in and it's ready to use.

One Word or Another

TO MAINTAIN ACCURACY, AS WORDSCAN reads words, it compares them to those in a built-in dictionary. AccuText also provides this function, but WordScan's version is considerably faster. Still, *continues*

radius

Rocket

The Radius Rocket dramatically increases the performance of your Macintosh. Both graphics and calculations are up to 10 times faster. Offering you the first multi-processing NuBus system optimized for high-speed data transfer, Radius Rocket's 68040-based acceleration engine launches your Macintosh beyond the speed performance of a Macintosh IIx.

radius


ROCKET

ACCELERATE

Padded cell not included.

No one will think you're skeptical, money conscious or overly cautious for not considering the Radius Rocket 25i. Just basically insane.

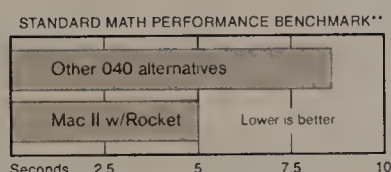
Simply because the Rocket is the easiest way to turn your Mac* into one bad apple. It easily plugs into your

 \$1499

NuBus slot and protects your current investment by utilizing your Macintosh, not replacing it. Rocket enables your existing motherboard to handle I/O commands while its 040 co-processor

races up to six times faster than your Mac II.

Recent tests conducted by MacWEEK show the Rocket beating the pants off other 040-based alternatives in graphics performance.



Requests for processing time and integer-math tests.

If you're interested in an incredible 040 upgrade with the \$1,499 Rocket 25i, or the \$1,999 Rocket with the integrated math coprocessor, call us at 1-800-227-2795 for a free Rocket Lift-Off compatibility disk and brochure. Or dial 1-800-966-7360 for faxed information.

If you'd like, we'll reserve you a brand new Rocket. If not, we'd love to reserve you a suite at Happy Acres.

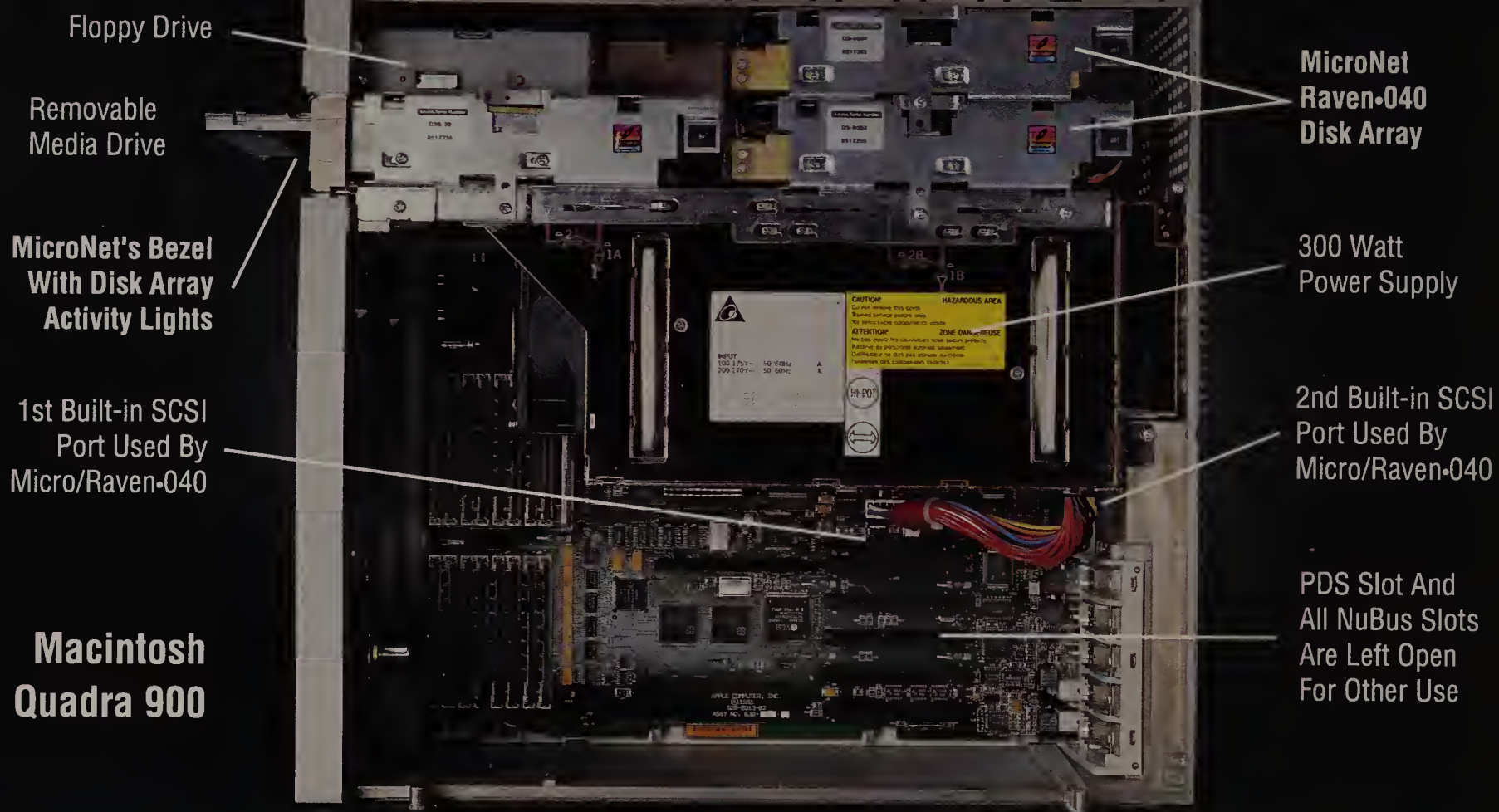
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©1992 Radius Inc. The Radius logo and all Radius product names are trademarks of Radius Inc. For your local Radius International Reseller, call 408-434-1010. *Compatible with the Macintosh II, IIx, IIcx and IIci. Tested under System 6 Finder with RAM cache off. Tests performed in black and white on 12- or 13-inch monitors, with AppleTalk off, minimum disk cache and extensions turned off. MacWeek 10/22/91

Circle 178 on reader service card

Disk Array•040!



High Performance Storage For The Macintosh Quadra 900 MicroNet's Raven•040 Internal Disk Arrays

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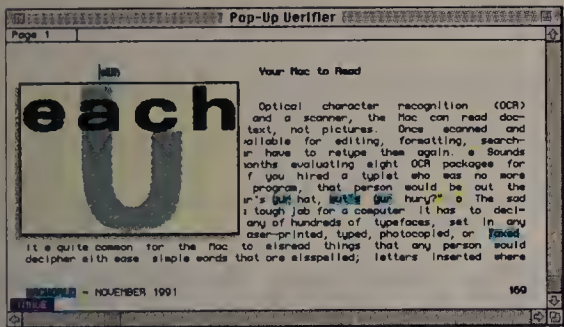


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Circle 113 on reader service card



Cheat Sheet WordScan Plus shows you a detail of the original scanned page to compare with questionable words and misread characters.

like any OCR program, WordScan frequently misreads text. But rather than requiring you to find and correct errors on your own, WordScan highlights recognition errors—words that don't match its dictionary—and lets you jump from one error to the next. WordScan provides no post-recognition spelling checker, as OmniPage does, but it does provide a search-and-replace command. WordScan Plus enables you to display an enlarged detail of the questionable entry so you can proof and correct a mistake without the original hard copy.

Once mistakes have been corrected, WordScan Plus provides a style-sheet feature that can automatically format a current document, including character and paragraph attributes. Unlike similar functions in word processors that save style sheets within documents, WordScan Plus saves style-sheet definitions to a preferences file, so that they can be applied to other documents. Unfortunately, you cannot apply more than one style sheet per document.

WordScan provides drivers for Apple, Epson, Howtek, HP, and Microtek scanners. WordScan also recognizes text from PICT and TIFF files, whether scanned to disk or received via fax modem. Additionally, if a fax image has a low resolution, as in the supported 100-by-200-pixel picture received by a Dove fax modem, WordScan doubles the horizontal or vertical resolution of the image to increase the potential for recognition.

Some of WordScan's commands could be better implemented. It took me several minutes to figure out that choosing the Pop-Up Verifier command takes you to the built-in text editor. I encountered a handful of problems not mentioned in the documentation. For example, while Calera claims that WordScan is fully compatible with System 7, the program does not allow you to position scanner drivers in the Extensions folder, despite the fact that WordScan's drivers are Chooser extensions. And the program is incompatible with 24-bit color display.

I don't consider any of WordScan's problems debilitating—especially in light

of the deluge of problems normally associated with OCR. In fact, once I got used to its idiosyncratic interface, I found WordScan worked more accurately with less effort than either OmniPage or AccuText. WordScan Plus offers some nice conveniences, but I'm not sure they justify the \$400 difference in price. If Calera were to knock \$300 off the list price of WordScan Plus, I would easily recommend it over any other OCR product costing less than \$1000. Of the two programs, I lean toward the less expensive WordScan. It gets the job done, and in the world of OCR, straightforward recognition is what it's all about.—DEKE MCCLELLAND

Still-Video Cameras

Dycam Model 1

PROS: Compact; easy to use. **CONS:** Produces gray-scale images only; short battery life.

COMPANY: Dycam (818/998-8008). **REQUIRES:** Mac SE; 32-bit QuickDraw. **LIST PRICE:** \$895.



Canon RC250

PROS: Stores up to 50 color images per video floppy disk; easy to use; hooks up to any television.

CONS: Included video-digitizing board adds video artifacts to images. **COMPANY:** Canon (516/488-6700, ext. 3359). **REQUIRES:** Mac II; 2MB of RAM; 8- or 24-bit graphics display. Recommended: Hard drive. **LIST PRICE:** \$1099.



CAPTURED VIDEO FRAMES ARE EXCELLENT components of desktop presentations and, with the advent of QuickTime, are becoming more widely used. The primary video sources for frame capture are prerecorded formats like videotape and laser disc, and live, full-motion video from a camcorder. But they're not your only choices.

A still-video camera is much like a regular film camera, except that it captures a video image and saves it on a miniature floppy disk or in RAM.

Canon RC250

THE CANON RC250 (FORMERLY CALLED the Xap Shot) resembles a standard 35mm film camera, but instead of exposing film, the RC250 captures images on a solid-state chip called a charge-coupled device (CCD). The CCD captures one field of 16-bit color video. Up to 50 images can be stored in an analog format on a 2-inch video floppy disk. Resolution is comparable to that of many VHS camcorders,

and you can play back your pictures on most televisions, using the supplied video adapter and battery charger. The camera has a built-in automatic flash, a small LCD panel showing the number of shots taken, and a few buttons that control recording and let you step through your shots on playback.

To get these still pictures into the Mac, you need a video-capture board, which digitizes the analog image saved on the video floppy disk. Canon bundles the RC250 with Digital Vision's ComputerEyes/Pro.

The RC250-ComputerEyes/Pro bundle is easy to use. After charging the camera's battery, I inserted the video floppy, turned on the camera, and started taking shots. After taking a variety of shots, I hooked up the camera to the charger/video adapter, and connected the adapter to my television via a standard RCA-plug video cable. The pictures appeared on the screen.

The picture-quality is extremely dependent on the available light. Some shots that I took outdoors just before sundown were too dark, although there was plenty of light to the eye. With sufficient light, the pictures are much clearer and more detailed, although video scan lines are quite noticeable. The ComputerEyes/Pro digitizing board is just as easy to use as the RC250. After loading the board's software and placing the board into a NuBus slot on my Mac, I plugged the camera adapter's video-out into the digitizing board. The video-capture application allows you to preview an image and make adjustments to the brightness and color balance before you capture the frame to disk. You can save the captured image in PICT or TIFF format. As previously reported in *Macworld* (see "Frame by Frame," March 1992), the ComputerEyes/Pro's captures lack contrast, and the board tends to add color speckles, smearing of fine details, and other video artifacts into the picture. I was able to get cleaner captures from two other video-capture boards, but in fairness, those boards each cost more than the whole RC250-ComputerEyes/Pro bundle. For the user looking for an inexpensive still-video system, the ComputerEyes/Pro board provides adequate captures.

Dycam Model 1

THE DYCAM MODEL 1 DIGITAL STILL Camera uses a different approach than that of the RC250. The flat, vertically shaped camera has a built-in flash and a fixed-focal length lens. The Dycam records images in 8-bit gray scale, digitizing and saving them to RAM inside the cam-

continues

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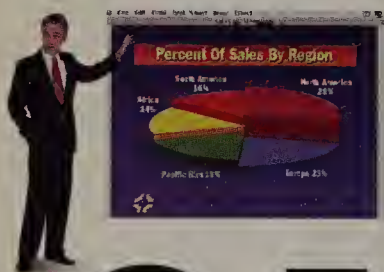
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era. There's enough RAM to store 32 images, but you can't store them for long—the rechargeable batteries inside the Model 1 ran out of juice overnight (the manual warns you to recharge the batteries as often as possible). Recharging takes about six hours. The Dycam Model 1, however, is easy to use; you simply point and shoot. The flash works automatically; there's no manual override.

Using Dycam's software, you download the images to the Macintosh via a cable plugged into the modem port. You can save the images as TIFF files. The Dycam creates detailed gray-scale images, and it also supplies a limited gray-scale-editing program.

I prefer the RC250 to the Dycam. The RC250 stores images permanently on floppy disks, it plays them back on any standard TV, and the images are in color. The Dycam Model 1 is uncomfortable to hold and shoot because of its vertical shape, and you need to quickly download the images. The Dycam pictures, although gray-scale, are more detailed and better balanced than the RC250's, without the RC250's scan-line problems. If you don't need color and if detail is of primary importance to you, the Dycam is the better choice. However, at \$895, the Dycam is overpriced. You can get the RC250-ComputerEyes/Pro bundle for not much more money, and you'll be getting a more convenient, color product.

—TOM NEGRINO

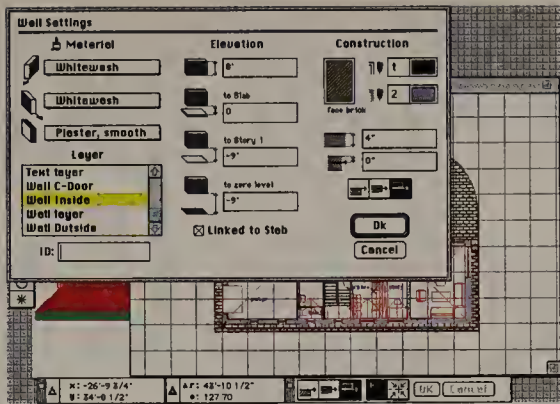
Architectural CAD Software

ArchiCAD 4.02

PROS: Good 3-D importing and exporting capabilities; includes photo-realistic renderer with Phong shading; has large library of 3-D objects; stand-alone plotting software accepts most CAD formats; powerful macro language. **CONS:** Cannot draw in section view; slow redraw in some views; weak 2-D drafting tools. **COMPANY:** Graphisoft USA (415/737-8665). **REQUIRES:** SE/30 or Mac II with coprocessor; 4MB of RAM; System 6.0; hard drive with 8MB of free space. **LIST PRICE:** Version 4.1 \$4450.



ARCHICAD BY GRAPHISOFT IS A powerful, full-featured, integrated CAD package designed especially for the architecture and engineering markets. ArchiCAD's graphic interface is considerably improved over previous versions and now includes a selection tool for stretching and moving objects with the mouse. The program's 3-D interface is simple but powerful. It builds on a construction



Wall Dialog Box Block size and material attributes are entered through dialog boxes in ArchiCAD.

metaphor, using basic block shapes to represent slabs, walls, and roofs, which the user defines (along with their material attributes) through a dialog box. These elements can then be combined and manipulated to produce architectural forms—from simplified buildings to complex interior spaces and urban-design projects.

Once you've defined a block, ArchiCAD's 3-D tools let you cut, stretch, and rotate it, punch multisided holes into it, and combine it with other blocks to form curved surfaces. Blocks can be multisided and faces need not be vertical. The Cleanup Intersections command can be invoked manually or automatically to tidy up wall intersections.

ArchiCAD comes with a powerful macro language called GDL (Geometric Description Language). With GDL you can create parametrically defined solid objects that represent building components such as structural elements, doors, windows, and furniture. My experience, however, is that most architects are not experienced with programming and will leave GDL to the techie types. ArchiCAD also allows you to import complex 3-D objects directly from any modeler that creates export files in DXF format.

You begin by entering a design in plan view. ArchiCAD's database structure enables you to make all revisions from there, updating all elevations, sections, 3-D views, and materials requirements accordingly. The floating-point-based database is extremely accurate. Unfortunately, unless you use one of the faster Macs (ideally a IIfx or Quadra), even simple structures usually redraw very slowly. System 7.0.1's SANE (Standard Apple Numerics Environment) patch helps, as does turning off hatching and using smaller windows, but then, why bother to have those expensive 19-inch monitors?

Another shortcoming is that while the program lets you view a design from almost any viewpoint (plan, section, elevations, perspective, and isometric), you can only draw in the plan view. This means that creating, modifying, and selecting

stacked objects (such as transom windows above doors) all require extensive use of dialog boxes to set *z* parameters (height). This quickly becomes tedious in a production situation.

One impressive aspect of program design is ArchiCAD's ability to cut more than one oblique section plane through a 3-D object, in any of three viewing windows, effectively carving a new object from the original. The new part can be saved to the program's 3-D object library.

ArchiCAD comes with a large library of parametrically defined 3-D objects. Doors and windows are available as both 3-D objects and related 2-D plan symbols. Graphisoft's libraries are based on the American Institute of Architects' architectural graphics standards and organized according to the 16-division Masterformat classification system—a nice touch.

When you've completed a design (or while you're working on it) you can do a complete quantities takeoff (calculation of necessary materials) of your project. The Bill of Materials spreadsheet provides materials descriptions, shows areas and volumes, and calculates cost estimates based on unit costs you supply in the creation dialog boxes. However, finding net areas in ArchiCAD is much more difficult than with a competing product, Architrion, from Gimeor.

You can print or plot directly from ArchiCAD, but the package also includes a stand-alone program, PlotMaker, for combining, arranging, and plotting CAD files from almost any source. I was unable to test PlotMaker, but according to the documentation, it accepts ArchiCAD, DXF, HPGL, and PICT formats, as well as supporting all the popular pen and electrostatic plotters and laser printers.

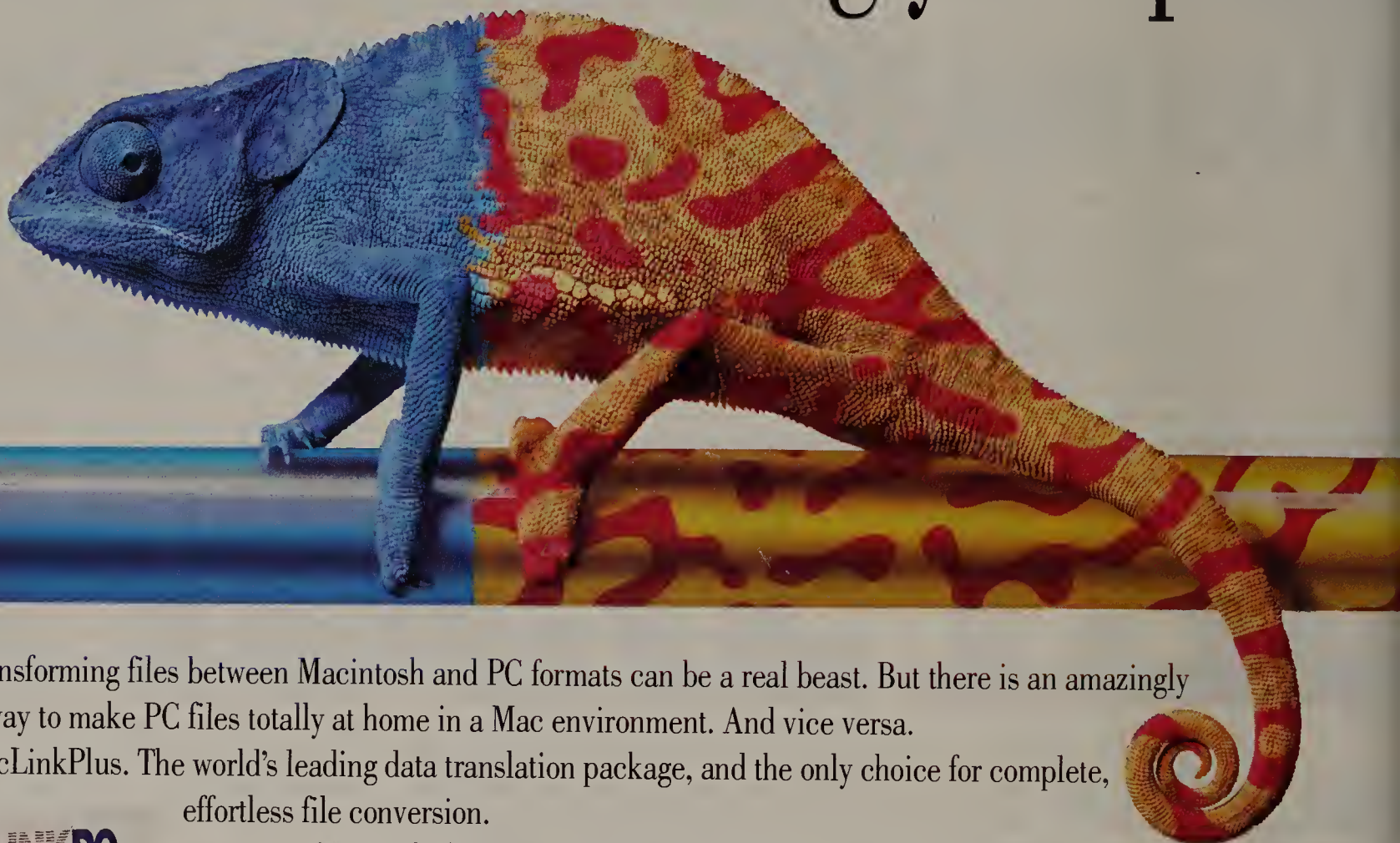
Rendering and Animation

THE MOST SIGNIFICANT IMPROVEMENTS in ArchiCAD version 4.02 are its photo-realistic renderer and animation tools. The program accurately casts building shadows based on solar date, time, and location on earth. ArchiCAD accounts for a material's surface qualities and can define its reflectivity (both specular and diffuse) and the degree of transparency or emission (glowing). You can select faster flat shading or slower but more realistic Phong shading, and you can also include antialiasing.

The program allows you to place PICT images, such as a cloudy sky, to create a background behind a model. The renderer has only one light source, but models can be easily exported to either Pixar's MacRenderMan or Strata's Strata-Vision 3d for rendering with multiple

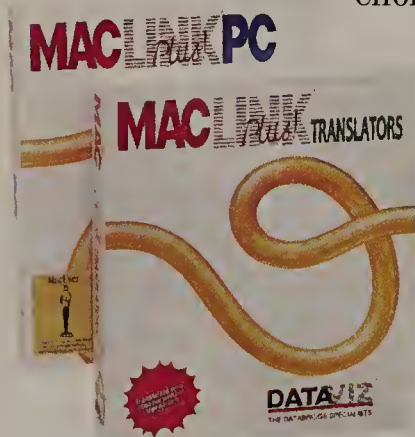
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light sources, texture mapping, or ray tracing.

ArchiCAD's animation tool, Fly Through, lets you set a sequence of views through a project. These can be saved as a sequence of PICT or PICS files for use in animations or QuickTime movies.

ArchiCAD incorporates most of the features that an architect could want in an integrated package. That is not to say there aren't deficiencies. The 2-D drawing and dimensioning tools are weak, lacking the automatic tangent, fillets, and perpendiculars options that competing products have (Graphisoft says version 4.1 greatly strengthens the 2-D drawing tools). Also, not being able to work in section view is a serious shortcoming, one that I hope will be corrected in the future. The construction metaphor is good, but in the early stages of a design (massing studies, for example) I would like to work without worrying that I haven't filled in all the attribute choices in the dialog boxes.

On the other hand, the documentation is very readable, organized, and well indexed—a rarity among CAD manuals. The tutorial guide is also well done, with a good sample building project.

At \$4450, ArchiCAD is not an impulse purchase. The ongoing support relationship with a software company is as important as the software's feature set. Good, knowledgeable CAD dealers are also important. You want to deal with people who will both provide an overall orientation of the software's features and tailor training to fit the way your office works. Graphisoft has a regular upgrade cycle for its software (averaging one minor and one major upgrade per year), and offers free upgrades and unlimited toll-free telephone support for the first year. A maintenance contract is available after the first year. In addition, Graphisoft provides training seminars throughout the United States, and ArchiCAD user groups have been formed regionally. The company has a mentor program that connects new users with experienced users to help them get started. There's even an active online network of ArchiCAD users, in addition to Graphisoft's own America Online tech support.—DANIEL M. GONZALES



MacSpeakers (left), Bose RoomMates (right)

Shielded Stereo Speakers

Bose RoomMate

PROS: Rich, bassy sound; doubles as regular stereo bookshelf speakers. **CONS:** Heavy; expensive; muddy highs. **COMPANY:** Bose Corporation (508/879-7330). **REQUIRES:** Mac Plus; Mac II series for stereo. **LIST PRICE:** Pair \$339.



MacSpeaker

PROS: Beautifully designed for close-up listening; unique movable stereo image; crystal-clear highs. **CONS:** Weak bass; not powerful enough for use as regular stereo-system speakers; unwieldy transformer. **COMPANY:** Persona Technologies (415/871-6000). **REQUIRES:** Mac Plus; Mac II series for stereo. **LIST PRICE:** \$249.



WE CAN PROBABLY AGREE THAT the Mac's little built-in speaker doesn't stir the blood of audiophiles everywhere. But even if you need better sound quality (because you're a musician or a megalomultimediac for instance), why do you need special speakers?

Unfortunately, speakers are basically electromagnets. So you need *shielded* powered speakers, which have a special interior lining to prevent any magnetic distortion of your delicate computer.

MacSpeaker

THE MACSPEAKER IS A PAIR OF SLEEK, platinum-color speakers 8½ inches tall; they come with Velcro to fasten them to the sides of the Mac. For people who care, they've got 10 watts per channel and have a frequency response from 70Hz to 18,000Hz. What's more, the MacSpeakers, unlike normal stereo speakers, are designed to be positioned only 2 feet apart, and you're supposed to listen to them from only a few feet away.

What's especially likable is that the messy power and Mac jack cables are attached to the left speaker. Only a single thin cord snakes behind the Mac to the right speaker; nonetheless, the volume, stereo-imaging, and bass knobs on the left speaker control the sound coming out of both. What's not so likable is the power transformer: it's a gargantuan 2-pound black cube halfway along the AC cord.

But most noteworthy is the stereo-imaging sound control. You can adjust a knob on the left speaker to make it sound as if the right and left sound sources are farther apart. This is handy for three reasons: first, you can adjust the focus point

of the stereo sound to accommodate your distance from the Macintosh. Second, making the stereo-image sound wider means that more than one person can receive the full stereo effect, without being perfectly centered between the two speakers. And finally, the sound experience when the speakers seem to drift apart is really cool.

And they sound pretty good. They're three-element speakers, meaning there are three individual speaker cones in each; the results are crisp highs and a meaty midrange. The bass is wimpy, though, even at the bass control's highest position. If you need a fuller sound Persona sells the MS Sub, a compatible subwoofer unit that should put the "not enough bass" complaints to rest.

Bose RoomMates

THE BOSE ROOMMATE COMPUTER Monitor speakers are identical to the regular RoomMate speakers, except for the added shielding and the platinum color. They're at least twice as heavy and a third wider and deeper than the MacSpeakers; that makes them sound bassier and quite a bit richer, although the single 4½-inch speaker cone in each cannot make the highs sparkle like the MacSpeakers can. Although Bose refuses to release its product specifications, a friendly technician revealed that the RoomMate speakers have an 80Hz to 15,000Hz frequency response with 6w to 8w per channel. The Bose speakers are clearly the choice where power and room-filling sound is important.

The physical design is nice enough: the volume knob is cleverly set into the face of the speaker for easy access, and there's no ugly transformer box—only a thin power cord that emerges from the left speaker. There's no way to mount them on the Mac, but Bose offers a \$50 mounting stand for your desk. The RoomMates' key aspect is that they can double as regular bookshelf speakers for a stereo system; of course, that's the flip side of saying that they're not really designed for close-up listening as the MacSpeakers are.

So what do you buy? The MacSpeakers have the edge on price (\$100 less), sound clarity, and attractiveness. The RoomMates sound fuller and have more power, but lack the crisp highs. Otherwise, both speaker sets work well with regular audio equipment and with what few stereo Mac products there are. But stereo sound isn't all speakers are good for; anything the Mac utters benefits from amplification and crisp, clear broadcast. The Talking Moose never had it so good.—DAVID POGUE

Historical Strategy Game

Nobunaga's Ambition

PROS: An absorbing, challenging game with good historical background; beautiful sounds; limited but nice graphics. **CONS:** Black and white only; manual not designed for Mac; interface sometimes annoying. **COMPANY:** Koei (415/348-0200).

REQUIRES: Mac Plus; System 6.0.3.

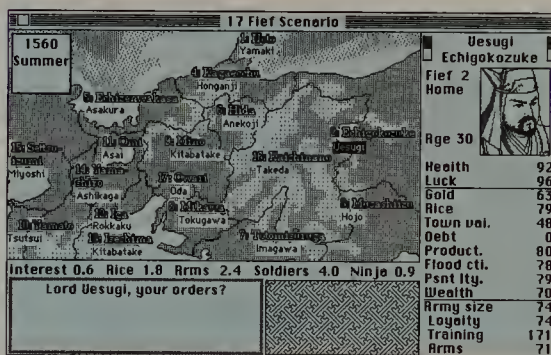
LIST PRICE: \$59.95.



NOBUNAGA'S AMBITION IS A FASCINATING strategy game in which one to eight human players are each cast as the daimyo, or warlord, of a small part of feudal Japan in 1560, during the bloody and tumultuous Warring States period. This is the age of Tokugawa Ieyasu (Clavell's Toronaga in *Shogun*), who unified Japan and established the dynastic Tokugawa Shogunate after the epoch-ending Battle of Sekigahara in 1600. Also ruling different fiefs are the famous Takeda, Ashikaga, and Hojo clans, among others, and of course Oda Nobunaga, a feared warrior who died just as he nearly realized his ambition of unifying Japan. Your aim, like his, is to conquer all the small states and usher in an era of peace.

The game teaches what all wise feudal

leaders knew: a strong peasantry is the key to long-term success. Through the judicious use of rice and gold you must improve peasant loyalty, peasant wealth, productivity, flood control, army size, and army loyalty; and you must expand the fief's main town. Meanwhile, the neighboring lords are either invading your fief or sending ninja who steal your peasants, set fire to your town, or destroy your flood-control dams right before the summer typhoons. The game's designers say they have added as much historical accuracy as possible. If you destroy the enemy command unit, all the enemy troops surrender and become loyal to you. But at times the enemy command unit will advance against or even attack a superior unit. It doesn't make tactical sense, but it fits with



The Struggle Begins With the player cast as Lord Uesugi of Echigo and Kozuke, the battle for Japan starts with the basics: improving the lot of the peasants and building up the fiefdom.

Bushido, the samurai code of honor.

The game's most annoying flaw is its interface: when you attack, you get a dialog box, with a slide bar, that asks how many thousands of soldiers you want for your invasion. After you move the slide bar to the number, the program brings up another slide bar and asks how much rice you want to bring along. Unfortunately, the default mode sets to only one unit of rice. You can set the proper amount, but if you hit the return key before changing the default setting, your army will not have enough rice to feed itself. At that point you can't stop the invasion, and your carefully trained and expensive army will defect to the enemy.

It's important to read the manual because there are lots of important subtleties. For instance, an army's command unit is marked by an X or an O instead of a unit number. It's not immediately apparent that the X means that an ordinary general is commanding the army, while the O means that the lord himself is with the troops.

The manual, although informative and full of historical information, was written for the PC version, and not all the commands are parallel. Overall, I really enjoyed playing Nobunaga's Ambition. If you appreciate games like Risk, Diplomacy, Strategic Conquest, or Spaceward Ho, and especially if you have an interest in medieval Japan, you'll find it totally absorbing.—TOM MORAN

Draw Program

Aldus FreeHand 3.1

PROS: Pressure-sensitive freehand tool works with or without tablet; exports to PICT format; substitutes missing screen fonts. **CONS:** Flawed support for stationery pads; insufficient text tools; most old problems unresolved. **COMPANY:** Aldus Corporation (206/622-5500). **REQUIRES:** Mac Plus; 2MB of RAM; System 6.0.5. Recommended: 5MB of RAM; System 7.0. **LIST PRICE:** \$595.



IN 1991 DENEBA SOFTWARE'S CANVAS and Adobe Illustrator both nudged out FreeHand in major awards as the best drawing packages of the year. If the new upgrade of FreeHand is any indication, however, Aldus is back in fighting form.

The most remarkable new feature in FreeHand 3.1 has got to be the pressure-sensitive freehand tool, the first of its kind in any vector-based drawing package. Teamed with a pressure-sensitive stylus and tablet, the freehand tool produces calligraphic lines of varying weight. Technically, this is impossible because lines printed to a PostScript printer must be constant in weight; FreeHand's workaround is to define the freehand line as a closed path—that is,

a snaking shape that becomes thick and thin with the pressure of the stroke. Even without a tablet, you can vary the weight of a line from the keyboard.

FreeHand 3.1 fully supports TrueType fonts, even letting you convert a TrueType character to Bézier paths—a function previously offered only in Canvas. The upgrade also supports System 7 balloon help and publish and subscribe. The only slipup is in the implementation of stationery pads. If you change an illustration file to a stationery pad at the Finder level, you convert the file to a FreeHand template, which opens as an untitled document. If you save a file as a template from within FreeHand, however, the file is not perceived as a stationery pad at the Finder level, which means that you can't search for it by kind, you can't view the icon in the Open dialog box, and so on.

When you export an EPS file from FreeHand 3.1, the program creates a link between the EPS file and its current illustration file. If, after you've placed the EPS file into a PageMaker document, you want to edit the original file, PageMaker will launch FreeHand and instruct it to open the original illustration, allowing you to make the desired changes. When you save the edited original, FreeHand automatically updates the EPS file on disk, and PageMaker automatically updates the placed version inside the PageMaker document. This proce-

sure also works for EPS files placed in a FreeHand document.

The fact that FreeHand can now open and edit some of its own EPS files qualifies as a step in the right direction. (I also place in this category FreeHand 3.1's ability to export in PICT format. FreeHand beats Illustrator in exporting PICT files, but plays catchup to every other drawing package.) Other changes, such as the smaller font size used in the palette lists, are only cosmetic.

But many enhancements are bona fide improvements. For starters, FreeHand 3.1 lets you substitute fonts for those present in an illustration but absent in your System file. When you open an illustration that contains text for which FreeHand cannot locate the correct screen font, the program gives you the option of printing the text in Courier (the FreeHand 3.0 solution) or formatting the text in a new font.

FreeHand 3.1 still needs improvement. Its text-editing tools, for example, rank among the worst in any draw program. (The new FreeHand 3.0 for Windows lets you create and edit text directly in the drawing area. FreeHand 3.1 for the Mac still requires that you create and edit text within a cumbersome dialog box.) And virtually all of the other complaints I had about FreeHand 3.0 still exist (see *Reviews*, *Macworld*, August 1991). Even so, FreeHand 3.1 is a move in the right direction.—DEKE MCCLELLAND

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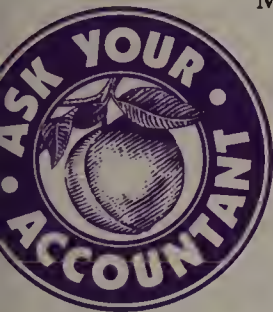
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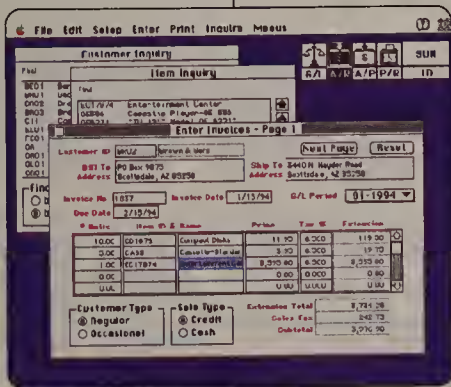
MacUser gave it four and one-half mice. But don't just listen to the reviewers. Ask your accountant about Peachtree Accounting for Macintosh. He'll tell you it's the next best



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Object-Oriented Development Environment

Prograph 2.5

PROS: Data-flow diagram is the program; supports all standard OOP features; completely supports *Inside Macintosh* standards; includes multiuser database engine; excellent tutorial and documentation.

CONS: Steep learning curve; difficult to use on small screen. **COMPANY:** TGS Systems (902/455-4446). **REQUIRES:** Mac Plus; 2MB of RAM; hard drive; System 6.0 or A/UX. **LIST PRICE:** \$495 (additional interfaces and tool kits optional).



PROGRAPH 2.5 PLACES MACINTOSH custom application development within the reach of Mac enthusiasts who have some programming experience. More-experienced developers can take advantage of the icon primitives that implement routines presented in *Inside Macintosh*, Apple Computer's six-volume guide to programming. Prograph's compiler creates stand-alone applications that fully conform to Macintosh interface standards. Version 2.5 takes advantage of the features of System 7, including IAC, balloon help, and 32-bit memory mode. Prograph is elegantly designed and its documentation is excellent, especially the tutorial overview. Learning

the program requires some time, but the effort is amply rewarded.

Prograph is a fully object-oriented system. It supports data abstraction by encapsulation, which shields the user from complexity; inheritance, which lets objects take on characteristics of a parent; and polymorphism, which means that each object responds with a method appropriate to its class.

Conceptually, Prograph is more advanced than traditional object-oriented programming (OOP) in that Prograph sends a copy of the object through the data-flow diagram rather than just messages from an object. Prograph's visual language shows input data and the resultant output data from an icon as connecting lines, as in any data-flow diagram. Diagrams, tables, forms, and icons are the programming elements of the Prograph visual environment, making it easy to visualize a program's logical branching.

Prograph's tool kit helps you specify application components, such as menus and windows, by using system classes for these elements. Components appear on screen just as they will in the finished application; you don't have to write code. The tool kit integrates the Prograph development environment with the Mac ROM-based toolbox and Mac Operating System managers. Toolboxes for C, Pascal, and SQL databases are also available from TGS Systems.

Prograph is well poised to take advantage of parallel processing computers. Its data-flow diagram is mature and powerful. Icons of different shapes help differentiate the processes. There is a standard set of classes, which the user can augment. TGS provides 15 icons for operations such as Get Attribute and Set Attribute, and 13 for controls such as Loop, List, and Next Case; more-refined distinctions among the icons are handled by labeling them.

Prograph manages the event loop for you, simplifying Macintosh programming. The integrated editor/interpreter lets you build an application, run it, stop the application to make changes, and then resume running.

C, Pascal, and FORTRAN language routines can be used from within Prograph. You can also invoke XCMDs and XFCNs that were created for use with Apple's HyperCard or Spinnaker Plus. New to version 2.5 is a database engine for creating flat-file, relational, and object-oriented databases. A sample flat-file database comes with the package, along with the source diagram so you can make changes.

Prograph has an international following notably in Japan, where the graphics-based program is particularly appreciated. With the program's solid design and expanded capabilities, Prograph's user base should broaden even further.—DAN SCHUSTER

SAT Training Program

StudyWare for the SAT 3.7N

PROS: Inexpensive; acquaints student with test formats; on-screen timer. **CONS:** No mathematical graphics; some supplied booklets not coordinated with program. **COMPANY:** StudyWare Corporation (619/495-0190). **REQUIRES:** Mac 512K; second disk drive. **LIST PRICE:** \$49.95.



SAT SCORES ARE ONE OF THE more terrifying aspects of high-school life. StudyWare Corporation, a leading vendor of drill programs for the whole alphabet soup of standardized tests that confront American students—ACT, GRE, GMAT, LSAT, and so on—offers a low-cost Mac study aid for the Scholastic Aptitude Test that can help lessen students' fears.

The StudyWare package includes a 250-page Cliffs *SAT Preparation Guide* as well as two booklets containing long text passages and geometrical figures. This material is not, however, as helpful as most of the widely available large-format SAT handbooks, such as Barron's. The program itself is essentially a follow-up quiz on the printed study material, with some additional drills.

In adapting the program for the Mac from earlier IBM-compatible and Apple IIGS versions, StudyWare failed to put geometrical figures or paragraph-length text on screen. Thus you find yourself reading the questions from a booklet but answering them on screen, which gets awkward. The interface is pretty stark, and some features of program operation (the timer, for example) aren't adequately explained. On-screen graphics and text windows—promised (along with MultiFinder compatibility) for future editions—will be a significant improvement.

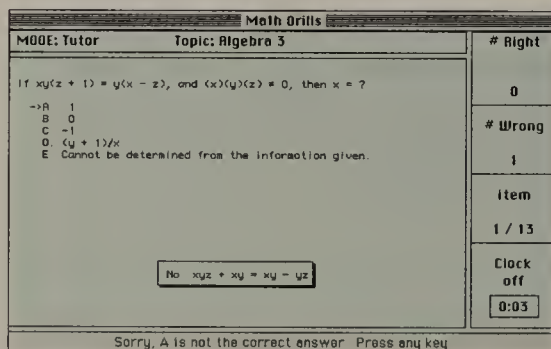
The program presents four full sample tests that emulate the SAT; a test on standard written English; and a series of drills on math (four levels of algebra, computation, and word problems), on verbal skills (syn-

onyms and antonyms, analogies, vocabulary, and so on), and on reading.

In Tutor mode, the drills give one-line explanations when you answer incorrectly (see "That's SAT"). That's not an awful lot of tutorial assistance, but it provides more training than the Test mode does. By contrast, Score Improvement for the SAT (\$99.95 from Queue) makes up custom drills based on the student's weak areas in a preliminary test. You can perform the drills in timed mode to simulate real SAT pressure.

StudyWare is most appropriate for students who need a quick brushup in some test areas and want to familiarize themselves with the SAT format, rather than those who need extensive work in the basics. To make a fair evaluation of the program, I first took two sample tests, then worked through all the available drills and the Cliffs guide, and took the remaining two tests. From my improved scores in the second pass at the tests, I estimate that conscientious work through the drills and sample tests is worth between 50 and 120 points each on the verbal and math parts of the SAT.

That's not bad for \$50 (or as little as \$27 from mail-order distributors), considering that high-school letter jackets cost more than \$150 and a prom date can run several hundred. The modest investment in money—and time—may pay off in some lasting results.—MARY S. TOTH



That's SAT In Tutor mode, wrong answers prompt an on-screen correction that may be characterized as a) short, b) terse, c) minimal, or d) all of the above.

NICE

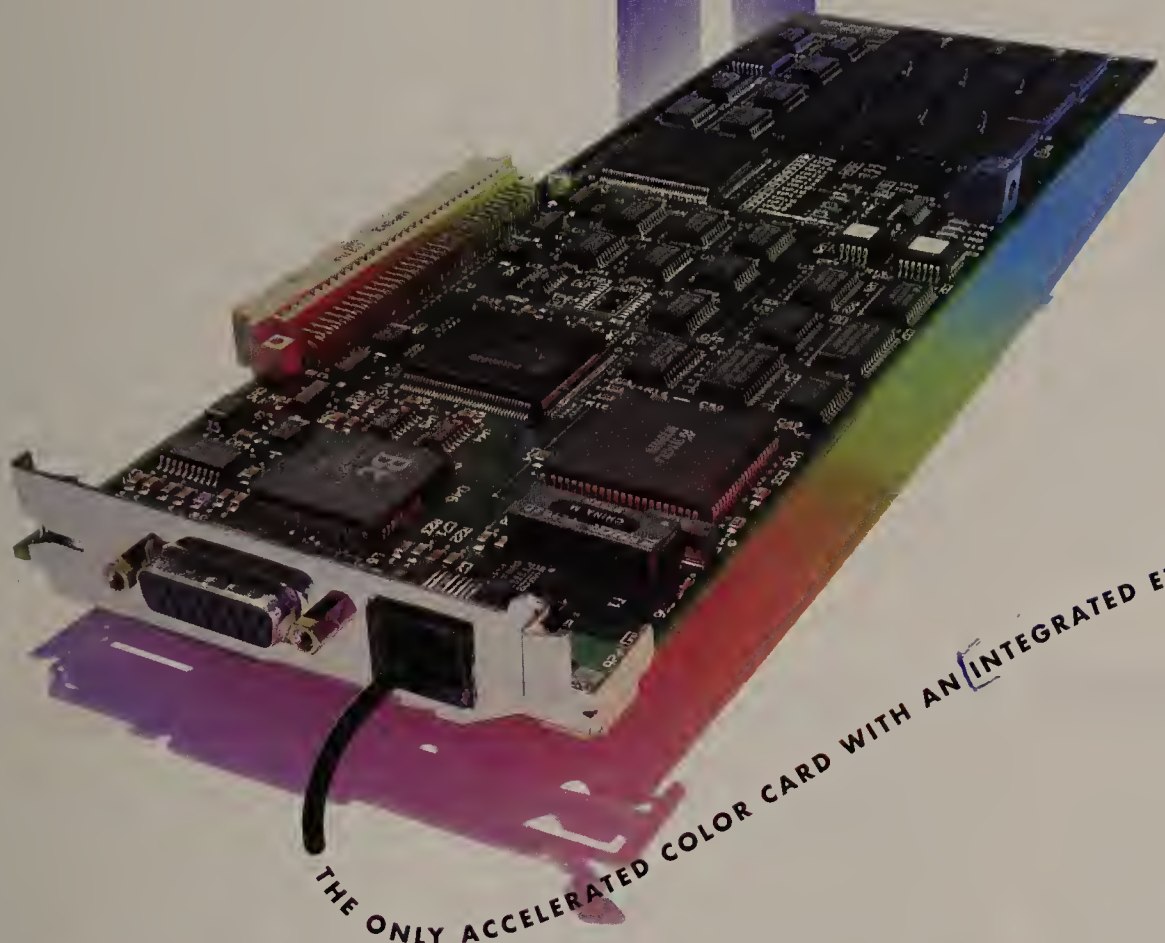


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Cordless Input Devices

SICOS Cordless Rechargeable Mouse

PROS: More freedom of movement than with corded mice; rechargeable. **CONS:** Flat case is hard to grip; material on desk can interfere with transmission; limited tactile feedback. **COMPANY:** Softcode Canada (416/477-5474). **REQUIRES:** Any Mac with ADB port. **LIST PRICE:** \$89.



SICOS Cordless Trackball

PROS: More freedom of movement than with corded trackballs. **CONS:** Click-lock button is hard to reach; material on desk can interfere with transmission. **COMPANY:** Softcode Canada (416/ 477-5474). **REQUIRES:** Any Mac with ADB port. **LIST PRICE:** \$109.



THE SICOS CORDLESS RECHARGEABLE Mouse and Cordless Trackball work by sending infrared signals to a compact unit that plugs into the Mac's ADB (Apple Desktop Bus) port. The manual recommends that either device be at least 1 foot

away from the receiver. Maximum operating distance is normally about 5 feet; a switch on the trackball lets you move up to 23 feet away, though battery life decreases. My house isn't big enough for me to verify the company's claim for the trackball, but both it and the mouse work from 10 feet away. Both units work equally well even when not in a direct line with the Mac.

The trackball uses four standard AA batteries, while the mouse runs on rechargeable batteries (a convenient mouse pocket also serves as a battery charger). Both the mouse and trackball shut down automatically after 10 minutes of inactivity. Hitting an on/off switch reactivates them.

The mouse has the same flat shape as the company's corded model; both are harder to grip than contoured mice. Also, the mouse button doesn't provide much tactile feedback. The trackball's layout could benefit from a few design changes, too. For example, it was awkward to reach over the ball to press the middle, click-lock button and rest my wrist comfortably on the desk.

Both devices come with a handy variable acceleration feature: if you roll the mouse or trackball slowly while pressing the on/off switch, the cursor tracks slowly; press the switch and move your hand quickly, and the pointer jumps across the screen.

The infrared transmission scheme requires constant line-of-sight communica-



SICOS Cordless Trackball, Receiver, and Mouse

tion, so you must be careful where you place the receiver. In some ways, both the mouse and the trackball are more reliable away from the Mac than on the desktop, where clutter can interfere with transmission. At close range, if you want to shift the mouse or trackball to a new position, you usually have to move the receiver too.

The most annoying problem has nothing to do with mouse or trackball design. Most Mac applications require that you use the keyboard every now and then, so the SICOS products are best suited to presentations, which don't call for typing.

Overall, I can't recommend either the mouse or the trackball for desktop use—the gain in mobility just isn't worth the compromises. Away from the desk, the mouse still needs a pad or other firm surface to work on. For stand-up work, the Trackball is an acceptable choice.—FRANKLIN N. TESSLER

Gray-Scale Hand-Held Scanner

PageBrush Professional

PROS: Ingenious concept; can scan full-page (or larger) images; produces 300-dpi gray-scale images. **CONS:** Very slow; hypersensitive mouse buttons; expensive. **COMPANY:** Mitsubishi International (415/544-2781). **REQUIRES:** Mac II; 2MB of RAM; hard drive with 4MB of free space; System 6.0.5. **LIST PRICE:** \$795.



SURELY IT'S A CURSE OUT OF GREEK mythology—to be blessed with a brilliant idea, but condemned to see it poorly executed. So it seems to be with Mitsubishi, whose PageBrush Professional gray-scale scanner (formerly marketed by Mouse Systems) is so clever that it makes your jaw drop—but the final product's rough spots make your heart sink.

The idea is that you can swipe this chalkboard eraser-size scanner across a full-size page in a zigzag, as though you're wiping the image with a sponge. As you scan, you actually see the image melt onto the screen, stroke by stroke, at up to 300 dots per inch, looking sharp. The software continually stitches the image together from your swaths across the page—so if you miss

a spot, it's perfectly OK to rub back over it. When you're finished scanning, you can touch up the on-screen image with a simple but well-designed set of painting tools and effects (Lighten, Darken, Enhance Contrast, and so on).

For the first time, you're freed from the 4-inch-width tyranny of all other hand-held scanners. You can scan anything, bound or not, as long as you can fit the 13-by-15-inch clear plastic sheet (whose invisible etched lines tell the scanner how far it has moved) over it. You're even liberated from the hassle of SCSI and power cords: the PageBrush Pro NuBus board slips into a Mac II, and the scanner itself is the only thing that dangles from the Mac.

Unfortunately, the rest is disappointing news. First, the unit doubles as a mouse—evidently a great idea in the DOS PC version, but a clunker for the Macintosh. As a mouse, the PageBrush Pro is too big, its trackers are far too sensitive (making the pointer fly across the screen with the slightest twitch), and the two hair-trigger mouse buttons almost click just by looking at them. What's wrong with oversensitive buttons? Nothing—except that the tricky scan-preparation process for this particular scanner involves two delicately timed mouse clicks; a third click ends the scan. Brush a button at the wrong time, and you've blown the whole scan.

Trying to avoid those buttons isn't the only physical challenge you have while scanning. You can't move the mouse/scanner faster than about an inch per second across the page, or its stitching-brain gets confused and you have to start over. And even if you do everything perfectly, successive wipes of the page can still get misaligned by a pixel or two, producing visible seams in scanned images containing physical or implied straight lines (like text columns).

The other problem is that the software is agonizingly slow. Applying an image filter to a 2-inch-square selection takes 2 minutes—you're hardly encouraged to experiment. Saving a postcard-size gray-scale TIFF file took 15 minutes (Photoshop, by comparison, took 33 seconds).

Oh, what a disappointment. If the PageBrush Pro scanning-setup process weren't so slow and finicky, if the manual had been proofread, if the clear plastic sheet weren't so vulnerable to fingerprints and scratches, and if the scanner weren't also a mouse, then the impressive technology built into this device would shine through, making it an eminently practical piece of graphics gear.

Still, though—what about the money you save? Isn't it worth the inconveniences to avoid the expense of a flatbed scanner? You decide. At this writing, you can get a Microtek gray-scale flatbed scanner by mail order for \$50 more.—DAVID POGUE

Minitab 8.2

PROS: Complete statistics package; uniform over many platforms; excellent teaching tool. **CONS:** Weak, typewriter-like graphics and output; results are static, requiring repeated analyses to view changes. **COMPANY:** Minitab (814/238-3280). **REQUIRES:** Mac Plus; hard drive; System 6.0. **LIST PRICE:** \$695; for educators \$395.



MINITAB IS ONE OF THE OLDEST statistical-analysis packages, and one of the best. It supports a broad (though not exhaustive) set of statistical tools; it's easy to learn from and easy to use. As a result, it has always been a favorite for teaching statistical computing. Its emphasis on graphics naturally leads students away from a fixation on the numbers, toward a greater understanding of the meaning that lies beneath.

Minitab was first designed for mainframes and minicomputers. The user typed in commands via a dumb terminal and received results (including graphs) in typed form. This command-line interface is a poor fit in the Mac world, and Minitab has been seen as a second-class citizen, its only advantage being uniformity across platforms.

Release 8.2 eliminates most of Minitab's interface problems. Macintosh-style menus and dialog boxes type the user commands in a window for you. Analyses, graphs, and session history appear in separate windows. Aside from a few gaffes (you can drag, but not shift-click, to make multiple selections), the interface is comfortable and Mac-like.

Many of Minitab's statistical limitations are gone too. You can now do unbalanced ANOVAs with a user-specified model, and there's a complete quality-control tool set, including CUSUM and EWMA charts. There's even an experimental-design set of functions, letting you generate statistically correct experimental protocols. Minitab's tables and graphs for means comparison after ANOVA have always been excellent, and they're even better here. For example, after a two-way ANOVA, Minitab displays graphs of means and confidence intervals.

Minitab still occasionally trips over its old-style interface. Data entered mistakenly in an unused worksheet cell yields a whole column of missing-value symbols that must then be erased. The graphics are a higher resolution than what you can get from a typewriter, and you can color your plots, but they are still far from what the Mac can do. The program supports only its own font and in only one size, but you can export plots to Canvas and make font and other graphic changes there. I also exported tables and

analyses to Microsoft Word, but the columns came out space-delimited rather than with tabs and didn't line up unless I used a fixed-pitch font such as Courier anyway.

Minitab's greatest drawback is that each analysis and plot is a one-shot deal: it's carried out and then displayed or printed—the end. The best Mac statistical packages have live output: graphs can be rescaled and rotated, analyses repeated with additional variables, and data related and highlighted among the various displays (for example, selecting the USA bar on a chart showing automakers highlights all domestic cars in a related scatterplot of horsepower versus mileage). The best products also offer context-sensitive help with advice on how to proceed further. Minitab has none of these useful functions.

The documentation upholds Minitab's reputation as a good learning environment. It includes an extensive reference manual, a separate text on basic statistics, and a year of free telephone help. Unfortunately, neither book is Mac-specific. Aside from a good Quick Start tutorial, none of the reference materials mention menus or windows. The manuals leave you to find the Mac equivalents for commands in a forest of menus, dialog boxes, and radio buttons. Online help is a guide, but I wound up typing everything anyway—just as I did when I used Minitab in 1979. *Plus ça change...* —PHILIP STEIN

Pro-Cite 2.0

PROS: Flexible; 20 predefined and 6 user-defined record forms; sorts by Dewey decimal and Library of Congress call numbers; compatible with DOS-based version of program. **CONS:** Some features complicated to use; does not directly download from online databases. **COMPANY:** Personal Bibliographic Software (PBS) (313/996-1580). **REQUIRES:** Mac Plus; System 6.0.2. Recommended: Hard drive. **LIST PRICE:** \$395; search-only version \$195.



PRO-CITE 2.0 BRINGS WELCOME relief for scholarly disorganization. A database program designed for bibliographic references, it enables researchers to store and retrieve bibliographic records for a wide range of materials. A variety of output formats make it easy to produce bibliographies in many styles, including those required by academic journals and professional associations. Pro-Cite can manage multiple databases of 100,000 records each, making it useful in professional settings such as libraries as well as to individuals.

A pop-up menu gives access to 20 predefined data-entry forms (called *workforms*)—from those for books and periodicals

to those for letters, manuscripts, works of art, music scores, and computer programs. You can add up to 6 custom forms. Records can contain up to 45 fields of variable length. Standard library bibliographic fields include author, title, publication dates, and call number (Library of Congress or Dewey decimal). For more specialized needs, you can add fields for such items as a reference within a source; storage location; type of document; or an abstract. The manual explains how to correlate bibliographic styles with Pro-Cite workforms. For example, a record for a published conference proceedings uses the Book, Long Form workform; unpublished proceedings use the Conference Proceedings workform; interviews take the Manuscript workform.

When it comes to selecting references for a bibliography, you can search a particular field, all fields, or fields using Boolean modifiers. You can save search expressions for reuse during a later retrieval. In addition, you can simply browse records, marking selections for a bibliography one by one.

Besides letting you create a bibliographic database from scratch, Pro-Cite imports records easily from the DOS version of the program and imports ASCII files from other databases. If you have PBS's Biblio-Link application (\$195), you can import and format records from online databases and CD ROM products.

A supplemental disk contains authority lists of frequently cited authors and journal titles, as well as bibliographic formats for the humanities and a broad range of the sciences. Users can also create custom authority lists. An Alternate Text feature saves typing by automatically substituting a full title or name for abbreviations when a bibliography is printed. This is handy, but requires the user to embed codes in each record.

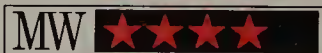
Pro-Cite's powerful punctuation files transform database records into bibliographies formatted according to, among others, the Modern Language Association, the *Chicago Manual of Style*, and *Science* magazine. The ability to produce large and complex bibliographies is immensely valuable, but the user is required to step through numerous windows to select the records and the appropriate punctuation file, set up the bibliography, and add field-style options. Manuscript Search creates a bibliography from citations in a document stored as text or in MacWrite or Microsoft Word format. It scans for embedded references and matches these to records in a Pro-Cite database, identifying citations either by author and date or by database record number.

Pro-Cite is a useful and powerful bibliographic tool. I just wish it were adaptable to other collection-management functions such as archival finding aids or museum inventories.—ROBIN CHANDLER

Folder-Protection Utility

FolderBolt 1.02

PROS: Easy to use; extremely flexible; excellent on-line help. **CONS:** No file encryption; does not work over a network. **COMPANY:** Kent Marsh (713/522-5625). **REQUIRES:** Mac 512KE; System 6.0.4. **LIST PRICE:** \$129.95.



FolderBolt isn't designed to protect entire disks or individual files. Instead, it works at the folder level. You can designate three levels of folder protection. Read-only folders contain documents that can be read by applications but cannot be altered without a password. This type of folder is particularly useful on a shared computer, where sets of important documents need to be accessible to everyone, but only one person (the one with the password) is charged with keeping the data up-to-date.

A second level of protection is the drop folder. Anyone can deposit files in a drop folder, but only those who know the folder's password can see or read them. Coworkers can leave files for you in a drop folder on your hard drive, confident that no one else will be able to see or change them.

FolderBolt's highest level of security is

the password-protected folder, which requires a password to do anything to the files—delete, copy, modify, or add new files.

What's special about FolderBolt is its flexibility. Virtually everything can be configured to your preference. For passwords, you can specify a minimum length, how they display when typed, whether they're case-sensitive, and whether they should be verified when first entered. When you choose Shut Down from the Special menu, FolderBolt can automatically relock all folders. You can also designate several bolted folders as belonging to a set, allowing you to deal with them collectively at start-up or shutdown, for instance.

The FolderBolt Administrator program provides a safety net for a forgotten password. As long as you have the original Administrator (or a copy made from the original disk), you can unlock any folder, set of folders, or all bolted folders. Since you also use the Administrator to set preferences and view the activity log, you'll probably want to keep a copy of it on the hard drive, too. To maintain security, you can require a password to run the Administrator.

There are a few compatibility issues. DiskTop can circumvent FolderBolt's read-only folders and make copies of items within the folders. And TOPS 3.0 is incompatible, though later versions work.

Of greater concern to most users is that

FolderBolt security may make other types of file, folder, and hard drive protection less convenient to perform. Disk-recovery tools, such as those included in SUM, MacTools Deluxe, and The Norton Utilities for the Macintosh, cannot operate on FolderBolt-protected folders. Similarly, backup programs cannot back up FolderBolt-protected folders. The workaround is to periodically use the FolderBolt Administrator to override the entire drive's protection, run the disk-recovery or backup program, and then restore FolderBolt protection.

Although FolderBolt works well under System 6.0.4 and later versions, it works best with System 7. Under System 7 you can use folders to protect applications, for instance, placing an application inside a read-only folder to make certain that none of your colleagues unknowingly alter the program. Or you might want to put that same program in a password-protected folder so that no one other than you can run it. Double-clicking on a document made by the program still results in launching the program, but under System 7, FolderBolt denies access to the application.

If you don't need encryption, FolderBolt should easily meet your security needs. If you decide later that you want encryption too, Kent Marsh sells an EncryptInit that works hand in hand with FolderBolt. —STEVEN SCHWARTZ

Historical Simulation Game

Patton Strikes Back: The Battle of the Bulge

PROS: Superior graphics; easy to play. **CONS:** Off-disk copy protection. **COMPANY:** Brøderbund (415/382-4400). **REQUIRES:** Mac Plus; 2MB of RAM for color; hard drive with 5MB of free space; System 6.0.7. Recommended: Color monitor. **LIST PRICE:** \$39.95.



IN THE PAST, MILITARY SIMULATION games—with all their military jargon and hefty manuals—took weeks to figure out. With Patton Strikes Back, however, veteran programmer Chris Crawford scores a direct hit. This easy-to-play and entertaining game pits your military skill against the Mac's in a simulation of World War II's critical Battle of the Bulge.

Patton Strikes Back has enough variations that you can avoid playing the same game twice. In the Historical setup, weather conditions and reinforcements closely follow those of the historic battle; in the Random setup they vary randomly. There are five difficulty levels, varying as to the speed with which the computer reacts to your di-

visions and devises its overall strategy. Since the game is an adaptation of the historical Battle of the Bulge, the Americans have the advantage of superior air power and reinforcements. For an additional challenge, you can opt to lead the German troops.

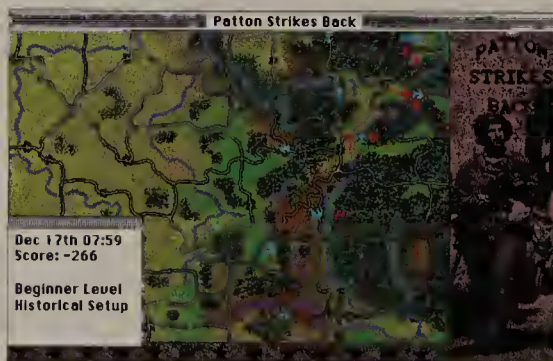
The game opens to a map of eastern France as it appeared on the morning of December 17, 1944. The Germans are in the east (in red), the Americans (in blue) in the west. Each division (or unit, as they are called in the game) is represented by a symbol on the map and can take on any one of four modes—attack, defense, mobile, and shattered. To move a unit or issue orders you use either the mouse or the keyboard. The unit's estimated time of arrival at the destination shows in a text window at the bottom of the screen. You earn points by

beating enemy units in battle and capturing towns, bridges, and road junctions. You can see all the strategic landmarks by selecting Show Landmarks from the Analysis menu. The game ends at 6 a.m. on December 28.

The text window provides valuable information, including the current date, the overall score, and each unit's vital statistics. You can click on any unit symbol, friend or foe, to find out its strength and battle readiness. The strength, readiness, mode, and type of unit determine the outcome of any given engagement.

Once or twice a day (in game time) the action stops and you zoom to a screen with a historical anecdote. This background is one of the game's best features, but if you're eager to press on just click on Return to Game. Clicking on Tell Me More brings up another screen with additional details. The History Book menu accesses a veritable warehouse of information not covered in the anecdotes.

Patton Strikes Back does have its quirks. If you're really thrashing one of the opposing units, the Mac tries to figure out a way to beat you, and the game slows down noticeably or even stops. My other complaint is the game's off-disk copy protection. But overall, I strongly recommend Patton Strikes Back. It's simple to learn but complex enough to keep even the most sophisticated player entertained. —ANDREW MILLER



On the Run After the first day of battle the Germans (in red) have broken through the American lines, sending the U.S. troops (in blue) into retreat.

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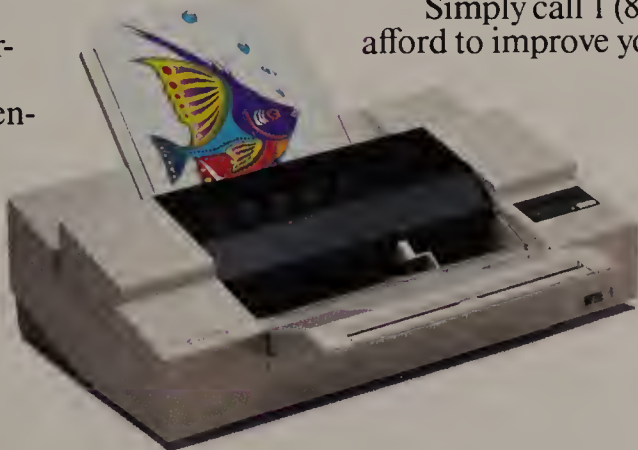
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Circle 110 on reader service card

Arcade Word Game

Wordtris 1.0

PROS: Fun for all ages; multitude of variations.
CONS: A little sluggish on slower Macs; copy protected. **COMPANY:** Spectrum HoloByte (510/522-3584). **REQUIRES:** Mac Plus; System 6.0.3; 2MB of RAM and hard drive for color. **LIST PRICE:** \$49.95.

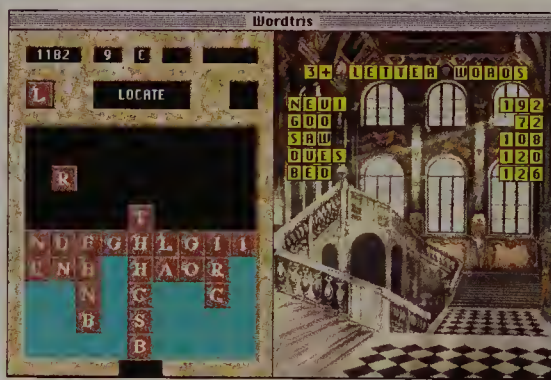


TETRIS SURELY DESERVES SOME kind of award. It's available on everything from high-end Macs down to palmtop Nintendo Game Boys. This puzzle classic defined a genre and inspired dozens of imitations and variations, including three from Spectrum HoloByte, the publisher of the Mac versions of Tetris, Welltris, Faces, and now Wordtris.

Like the others in the series, Wordtris is a falling-block game: tiles fall from the sky at an ever-faster rate; it's up to you to use the arrow keys to arrange them into words so that they disappear before filling a well. In this game the well is half-filled with water, so the tiles float. And instead of irregular geometric shapes, the puzzle pieces are square letter blocks. To clear the tiles, you must form words from the falling letters.

That's the basic idea, but there are plenty of embellishments. For example, one "magic" word is always displayed at the top of the screen; if you can spell that word out of the random stream of falling letters, you earn extra points and clear the well. There's also an occasional "mystery tile" that has a question mark instead of a letter; if you type a letter soon enough, the mystery tile turns into that letter. And every once in a while, a falling eraser allows you to remove a tile.

Wordtris has a way of steadily raising your pulse as you advance to higher levels and the pace increases. But Wordtris isn't for the purely arcade crowd; it's a word puzzle game that rewards strategy, literacy, and quick thinking under pressure. Wordtris is an arcade game for Scrabble lovers.



Pick a Letter When a question mark falls, you can turn it into any letter you want by typing that letter—but you have to be quick.

Wordtris is surrounded with graphics and music that reflect its Russian origins. The package includes both color and monochrome versions of Wordtris. The color version has stunning graphics, but not without cost; it demands 3MB of hard drive space and 2MB of memory.

If it included only the basic single-player game, Wordtris would rank as a first-rate Macintosh game. But Wordtris has all kinds of variations on the basic theme. Rare is the game that gives the user so much control. A Children's mode slows down the action so kids can keep pace. Tournament mode allows players to take turns with the same block sequence. Two people can play at the same time in the same well, choosing either Competitive mode or Cooperative mode. Head-to-Head enables two players to compete on separate Macs that are connected by a network or by modem; each word completed on one Mac puts a rock in the bottom of the other Mac's well. Head-to-head games can be especially exciting, but they tend to favor the faster Mac.

Wordtris uses a 60,000-word dictionary to determine whether letters make words, and you can add up to 1000 custom words. (If only English teachers and editors were so forgiving.) Wordtris is, in short, a super game. Let's hope it's not the last word in the tris series.—GEORGE BEEKMAN AND THE SHOEBEDOOP SOFTWARE TESTING TEAM

Color Painting Program

Expert Color Paint 1.0

PROS: Inexpensive; 15 levels of Undo; built-in virtual memory; versatile selection tools. **CONS:** Buggy at low memory settings. **COMPANY:** Softsync (305/444-0080). **REQUIRES:** Mac II; 2MB of RAM; System 6.0.3; 32-bit QuickDraw. Recommended: 4MB of RAM; color monitor; System 7. **LIST PRICE:** \$49.95.



ONE DAY, I'M DISMAYED AT HOW expensive software can be; the next, I'm wondering how much lower prices will go. Now, for example, for a street price of around \$28, Expert Color Paint offers more capabilities than Delta Tao's Color Mac-Cheese (\$99.95) and nearly as many as MicroFrontier's Color It (\$119.95). In fact, in a blind taste test, few users would be able to tell Color It and Expert Color Paint apart. The look-and-feel of the two programs is just short of identical; they share unusual command traits such as 15 levels of Undo; they even feature the same wacky set of default fill patterns.

The reason for the similarities is that MicroFrontier is responsible for both programs. As the story goes, Softsync admired

Color It and asked MicroFrontier to write a similar product. But with the users' best interest in mind, Softsync also recognized problems in Color It's interface and sought to remedy these in its new paint program. But is the result better than Color It, or is it just cheaper?

Like Color It, Expert Color Paint supplies a virtual memory feature that allows you to open an image whose size exceeds the amount of available application RAM. But where Color It has a complicated collection of memory-allocation options, Expert Color Paint doesn't bother you with details. This is both good and bad—good because it streamlines the interface, bad because it takes away a level of control that advanced users might appreciate. In Color It, for example, you can instruct the program to stop short of filling up the hard drive or to switch over to a second drive, floppy, or cartridge drive when the first becomes full—two options that can prove especially useful when scanning large images. By contrast, Expert Color Paint uses the start-up disk; when that disk is full, you're out of luck. Also unlike with Color It, you cannot scan images into Expert Color Paint.

Expert Color Paint equals Color It in many respects—Expert provides antialiasing, full support for System 7, and superior selection capabilities including a flexible magic wand tool that can be used to select

multiple areas of color. But Expert Color Paint lacks some of Color It's more sophisticated options. Color It provides support for the GIF, JPEG, and Photoshop formats; Expert Color Paint supports only the basic three: MacPaint, PICT, and TIFF. Color It provides masks, selection feathering, and unique dithering capabilities. Expert Color Paint does not.

But Expert Color Paint offers a straightforward interface that most users can master without reading the manual. In fact, I found its collection of moderate capabilities to be generally in keeping with its astonishingly low price tag. The only real problem I had with the program was at low memory settings. By default, Expert Color Paint is set to use 900K of application RAM when running under MultiFinder or under System 7. At 900K, I encountered bugs, particularly when trying to use patterns. Sometimes I could not select the pattern I wanted; other times when I tried selecting multiple patterns, most of the patterns never took effect. When I increased the RAM setting, these problems disappeared.

If you're a seasoned Macintosh artist, Expert Color Paint isn't likely to excite much interest. But for the novice, its tidy collection of features and low price tag make it a wonderful value, not to mention an ideal introduction to the color painting environment.—DEKE MCCLELLAND

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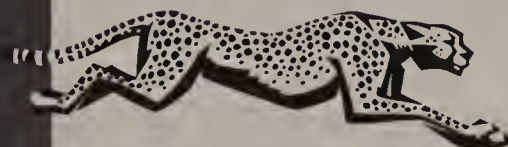
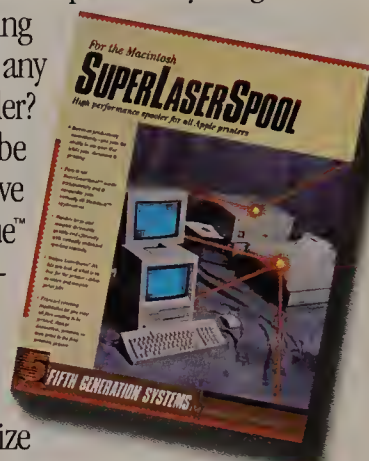
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Circle 94 on reader service card

Animated Clip Art

Animation Clips

PROS: Generally well-drawn animations; can be customized. **CONS:** Some clips choppy. **COMPANY:** Media In Motion (415/621-0707, 800/395-2547; fax 415/621-1724). **REQUIRES:** Mac Plus; 2MB of RAM; animation or authoring program; hard drive. **LIST PRICE:** Business 1 and Business 2 each \$99; with sound \$129.



MEDIA IN MOTION'S ANIMATION Clips Business 1 and Business 2 each offer 30 clips in PICS format, with optional sound. You can import the PICS-format clips into animation programs such as Authorware Professional, Gold Disk's Animation Works, and Motion Works' Addmotion, and then customize or combine them with other graphics and animations. MacroMind Director users can order the clips in Director format and open them with that program. Animation Clips' license allows you to incorporate up to five clips in any presentation for distribution.

Since the collections are business-oriented, they're heavy on office equipment, electronics, and computers. Other clips can be used metaphorically in business presen-

tations, like a cleaver splitting a coin, calendar pages ripping away, and mercury blasting out the top of a thermometer. Less businesslike animations include a jukebox, a ray gun, and beer pouring into a glass.

On the whole, the clips are well rendered—the jukebox, for instance, is a work of art. A few don't make the grade, though, like the pouring beer, which looks as if the artist might have imbibed a bit while drawing. Many of the animations are a bit choppy, since they're composed of a minimal number of frames, to keep the file size manageable; the clips range from 8K to 1155K, with most clips in the 20K-to-80K range.

I tested clips in Director, Addmotion, and Animation Works with no problems (they even work in Berkeley Systems' After Dark screen saver). You have to know your animation program to customize the clips, of course, but even amateurs can add text or make small changes to the clips.

Although most of the clips are of good quality, some of the choices of subject matter puzzle me. The stapler is nicely done and even makes a realistic *ka-chunk* when it staples, but I cannot conceive of an occasion where I'd need an animated stapler. The same goes for the saw cutting a board (the manual suggests using it to represent cutting through red tape, but I'd use scissors myself, or maybe dynamite). But perhaps I'm being unfair; working alone in my home office, I

rarely find myself creating business-related multimedia presentations.

However, to get into the spirit of things, I altered a few of the Animation Clips to make my own presentations in Director. I took the envelope animation from Business 2 and added my own message. Now, when my personal reminder program beeps at me on April 15, I can play the following sequence. An envelope appears on the screen, a letter opener zips in and opens it (complete with a ripping noise), and a piece of paper comes out of the envelope and unfolds, revealing the message: "Don't forget to make your quarterly tax payment, kiddo!" And all I had to do was type in the text.

For another project, I started with the Camera file from Business 1, one of my favorite clips in the collection: a camera appears, the bulb flashes, and a photo slides out of the camera; then you watch as the picture develops, using a dissolve effect from Director. I replaced the face in the photo with a picture of myself, and added a title, "Employee of the Month" (so I'm the only employee here—a little praise helps morale).

On the whole, I like the Animation Clips collections. Image quality varies somewhat, but most of the clips could enhance a presentation, assuming the subject matter is what you need; as with any clip art collection, you get the publisher's choice of subject matter.—ERFERT FENTON

Wireless Message Transmitter

Notify 1.0

PROS: Uses Mac for message input; easy to use. **CONS:** Unreliable; works only with System 7. **COMPANY:** Ex Machina (718/965-0309). **REQUIRES:** Mac Plus; 4MB of RAM; numeric or alphanumeric pager; paging service; 300-bps modem; System 7. **LIST PRICE:** Personal version \$149; network version \$399.



IF YOU WEAR A PAGER, YOU KNOW the service it provides. You have the exciting possibility of being contacted day and night. Someone dials your pager, plugs in a phone number for you to call, and as soon as you can get to a phone, you're connected. But it's not always easy to find a telephone, especially if you're stuck in traffic or sitting in the middle of a theater. Then, you pull off the road or climb over 11 pairs of knees just to receive an urgent, life-shattering message like, "The caterer is out of Camembert—will Brie do?" Using Ex Machina's Notify in combination with a Mac, a modem, and an alphanumeric pager can provide a brief message along with your page. But, like most version 1.0 applications, Notify has some limitations and lots of room to grow.

The concept and operation of Notify are simple enough. The application allows you (or a designated messenger) to type a message of up to 240 characters on your Mac. The message is queued in the Notify Server (in the System Folder) for transmission via modem to the paging company. The paging company transmits the message over radio airwaves straight to the pager.

During my testing, Notify worked fine about 80 percent of the time. I made an alias of Notify and put it in my Apple Menu Items folder and launched it from there. The interface for sending a message is straightforward and intuitive. You only need to enter the addressee and the message.

It was after I constructed my first message that I started encountering minor problems. On more than one occasion, after queuing a message into the Notify Server, the machine froze until Notify finished sending the message over the modem. On other occasions, immediately after start-up, my machine mysteriously began sending messages over the modem. I never received a page from this transaction so I chalked it up to a bug in the software. The people at Ex Machina were also unable to resolve this problem. An on-screen status indicator would be helpful in this instance to provide details of this modem activity.

A bigger problem concerns Notify's reliability. More than once the pager re-



Mac Goes Cellular With Notify, you can quickly send messages to a single person or a group of people from the Mac.

ceived a page I had sent even though Notify informed me that the paging company was unable to transmit it. Several times the pager received only a portion of the message even though Notify gave no indication of an error.

Unfortunately, it's not always easy to lay blame for these problems on the application or the paging company. This new way of communicating needs some hard testing and/or error correction before it can be accepted. Paging companies need to increase their awareness of this technology, and software companies need to establish more stringent error checking with paging services.

Notify needs some work before it can become an effective business tool that enjoys widespread use. I am anxious to see the results.—MATTHEW R. CLARK

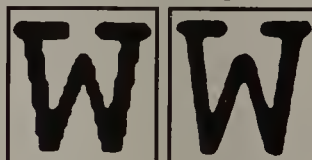
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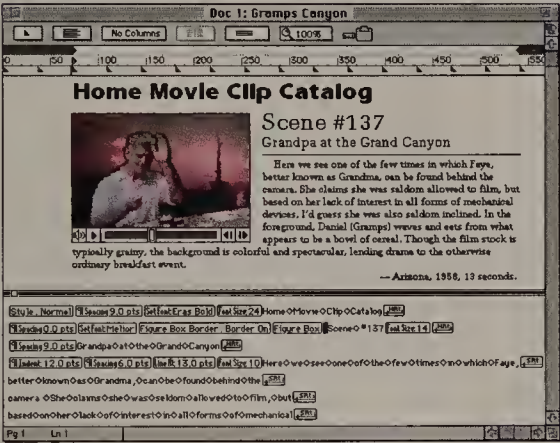
WordPerfect for the Macintosh 2.1

PROS: Supports QuickTime. **CONS:** Dictionary-editing utility undocumented; expensive upgrade price. **COMPANY:** WordPerfect Corporation (901/225-5000; 800/451-5151). **REQUIRES:** Mac Plus; System 6.0.5; hard drive. **LIST PRICE:** \$495.



WORDPERFECT FOR THE MAC HAS evolved from a product that only a converted DOS PC user could tolerate to a powerful alternative to Microsoft Word. With version 2.1, WordPerfect goes a step further by adding support for a number of System 7 functions and QuickTime, the new video-display and -compression technology. WordPerfect 2.1 provides both the regular online help found in the previous version plus comprehensive balloon help under System 7. And although the Save dialog box lacks a New Folder button, version 2.1 does a good job of supporting System 7's publish and subscribe, stationery pads, and TrueType fonts. Basic Apple events are also supported. WordPerfect 2.1 is the first, and so far

the only, word processor to support QuickTime. It even includes the 444K QuickTime extension. When you select an imported QuickTime movie, a play bar appears below the image. You use the play buttons or simply double-click on the movie to play it, sound and all; you click on the movie to pause at the current frame. You can even vary the sound level while the movie is playing. Thanks to version 2.1's improved handling of competing word processing formats, such as Microsoft Word and WriteNow, WordPerfect has become an ideal application for inserting visual demonstrations into a wide range of existing documents.



Grandpa Canyon As the first word processor to support QuickTime, WordPerfect 2.1 can be used to add movies to documents created in Microsoft Word or WriteNow.

WordPerfect 2.1 lets you add words to its main dictionary and edit the hyphenation of any word in its dictionary. This feature is ideal for users with specialized needs, as well as for Canadian and British users and others who subscribe to different word spellings (*colour* instead of *color*, for example). But to edit the main dictionary, you have to use the Spell/Thesaurus Maintenance Utility, a separate program that is entirely undocumented—no information in the manual, no ReadMe file, no online help. In fact, there is absolutely no mention of it or its capabilities except in the press release. If you already own WordPerfect 2.0, you can upgrade to version 2.1 for \$89 or, if you want to forgo the expanded (though still incomplete) documentation, pay \$39 for the disks only. If you're a corporate Mac manager, this news may seem hardly worth mentioning; you'll pay what you have to pay. But if you use WordPerfect at home or in a small office, \$89 amounts to a third of the street price many users paid for the original product (\$278). A gratis upgrade might have been a better way of promoting the company's reputation on the Mac. WordPerfect 2.1 is priced comparably to other high-end word processors, but except for serious QuickTime enthusiasts and self-guided dictionary editors, few owners of WordPerfect 2.0 will find the upgrade to version 2.1 worth the price.—DEKE MCCLELLAND

9600-bps PowerBook Data/Fax Modem

PowerPort/V.32

PROS: Internally mounted; V.42bis compression; attenuates noise on the line; sends and receives faxes; fax autoprint option. **CONS:** External telephone interface; limited modem-status information. **COMPANY:** Global Village Communication (415/329-0700). **REQUIRES:** Mac PowerBook. **LIST PRICE:** \$795.



IN THE WORLD OF MODEMS, THE V.32 fax/data modem is becoming a standard commodity. It not only exchanges faxes at 9600 bits per second (bps), but also exchanges data at the same fast rate. The PowerPort/V.32 supports sending and receiving faxes; V.42, MNP Class 5, and LAP-M error-correction protocols; and V.42bis and MNP Class 5 data compression. The well-written and complete manual includes detailed installation instructions, with clear photos detailing how to open the PowerBook, mount the modem board, and close the computer successfully. To preserve your Apple warranty, though, you must have the modem installed by an authorized dealer. Because the PowerPort's electronics take up all available in-board space, Global

Village put the analog telephone interface and jacks into an outboard credit card-size adapter that attaches to the PowerBook via a stubby 4-inch cable. There are some advantages to this approach: the adapter contains an extra jack for plugging in a telephone, and different adapters provide various European phone connectors (although only a U.S. adapter is supplied). The disadvantage is that you must carry, and avoid losing, the external adapter. The PowerPort has no speaker, external switches, or status lights. When a Mac application activates the modem, a miniature bar graph appears in the menu bar, depicting the volume of data flow through the modem. Dialing and connecting sounds are routed directly through the PowerBook's built-in speaker. In speed and compatibility tests with a dozen popular Mac communications programs, the PowerPort performed flawlessly in 2400- and 9600-bps operations. With V.42bis data compression turned on, throughput on long file transfers jumped to about 29,000 bps. The PowerPort is in a unique position to take advantage of 9600-bps data speeds using Apple's AppleTalk Remote Access (ARA). ARA lets you call your base-station Mac while on the road and establish a network connection just as if you were hooked up locally via AppleTalk.

To send a fax, you choose a destination address from the built-in phone directory, and then choose among options for image quality, cover-page style, and so on. You can send the document immediately or spool it for later transmission. The transmission process operates in the background. The menu-bar status display lets you monitor the progress of the transmission page by page. The PowerPort performs automatic error recovery, attempting to retransmit a document a predetermined number of times. You can set up the PowerPort to answer the phone and receive faxes automatically, or to receive faxes manually. Using automatic mode, you can optionally have the PowerPort wake up your sleeping PowerBook to answer incoming calls. You also can set an option to automatically print incoming faxes. Receiving and printing, like sending, occur in the background. A stand-alone application called FaxCenter lets you view and print received faxes and uses a drag-and-drop interface for scheduling faxes for transmission. You can combine faxes (enveloping), and forward (retransmit) received faxes to another location. The FaxCenter utility also maintains a fax activity log that records every fax transmission and any errors that occur. Overall, PowerPort is a capable and reliable communications tool well suited to PowerBook users' needs.—MEL BECKMAN

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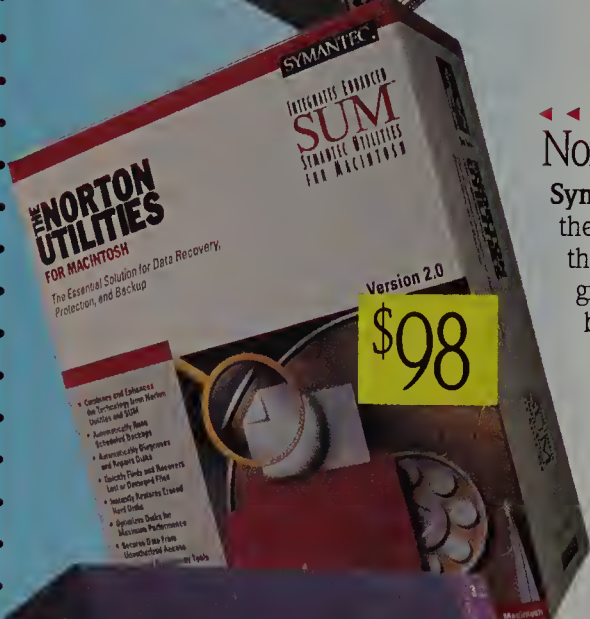
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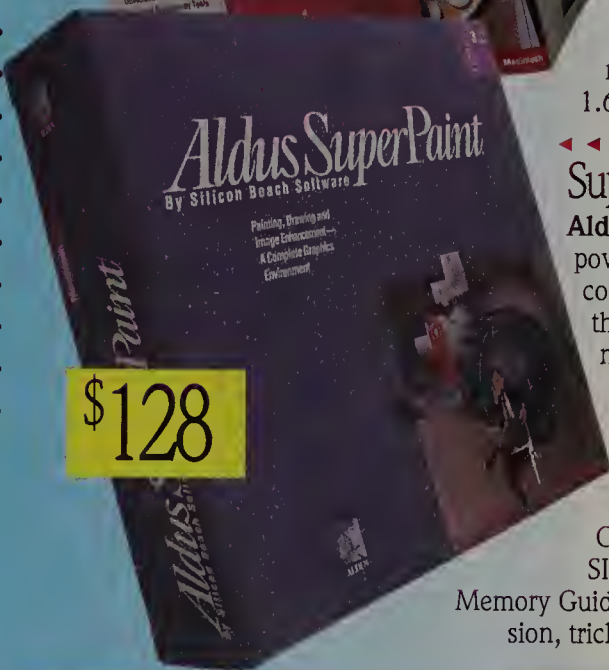
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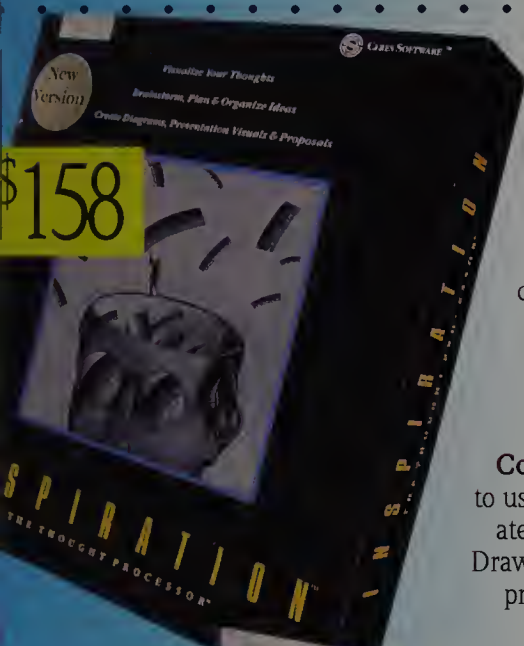
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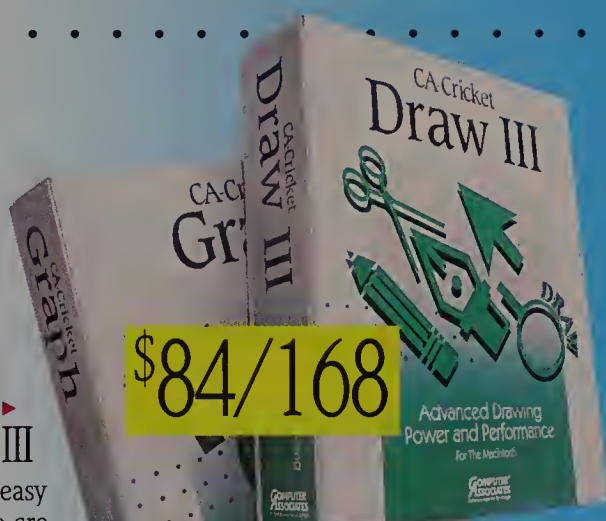
\$158

Inspiration

Ceres 7 Innovative visual thought processor for brainstorming, organizing, and communicating ideas as diagrams, mindmaps, presentation visuals, outlines, reports, and proposals. Integrates diagramming and outlining to help you see and communicate your ideas as visuals and text.

Cricket Graph/Cricket Draw III

Computer Associates 7 Cricket Graph - Quick and easy to use charting application ideal for anyone who needs to create graphs for reports, presentations or data analysis. Cricket Draw III - intuitive, object-oriented drawing program, produces professional-quality graphics. Both entry level and skilled users will appreciate it's ease of use and power.



\$84/168



\$128

ON Location/In Control/SuperDisk!

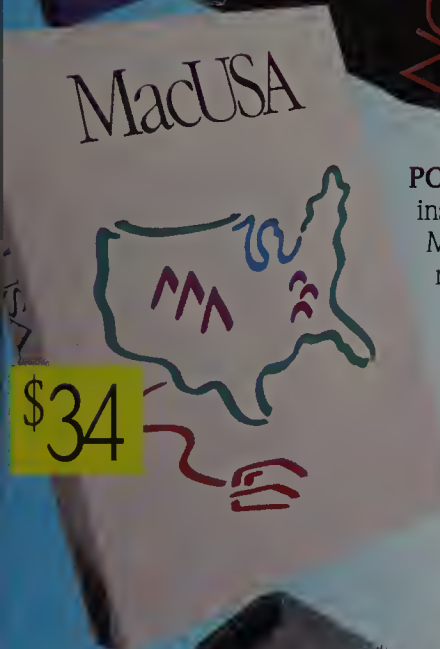
ON Technology 7 Three extremely useful utilities at an incredible price (normally \$219). ON Location will allow you to find any file or text stream instantly, In Control is the ultimate in list management and SuperDisk! gives lightning fast and efficient compression.

Soft Node 1.0/Universal SoftPC 2.5

Insignia 7 Add SoftNode to either Universal SoftPC or SoftAT and your Mac will run MS-DOS applications and share programs over a Novell PC Network! With SoftPC, your next IBM computer could be a Macintosh.



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\$34

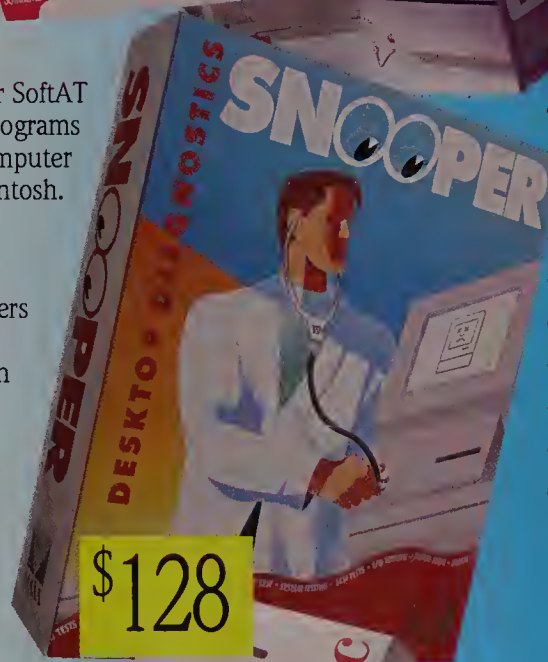
MacUSA

PC Globe 7 New state-of-the-art electronic atlas program that delivers instant profiles of all 50 states and Puerto Rico. Also ask about MacGlobe which profiles 190 countries. Both programs packed with maps, graphics and annually updatable.

SNOOPER

MAXA Corporation 7 Find problems fast with Snooper, the revolutionary suite of hardware diagnostic and testing tools. Snooper is easy-to-use, powerful and saves you time.

No set of Mac utilities is complete without Snooper, the hardware diagnostic. Also available with Nubus diagnostic card for only \$168.



\$128



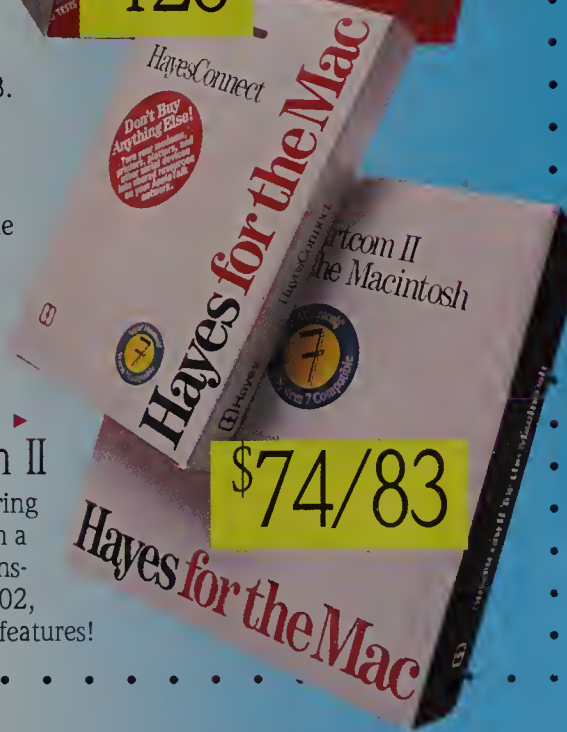
788/1468

TransWarp SE w/FPU

Applied Engineering 7 25Mhz version increases the performance of a standard SE by up to 500%, while the 40 Mhz board can boost an SE's performance up to 1000%. Comes standard with a 68882 math chip and will support 16-MB of memory.

HayesConnect/Smartcom II

Hayes Microcomputer 7 HayesConnect-Network serial device sharing software that allows any serial device to be shared over a network from a server. SmartCom II-Communications program that features error-free file transfers via Hayes Verification, XMODEM, MacTerminal XMODEM, VT 100/102, VT52, & TTY emulation. Plus many other features!



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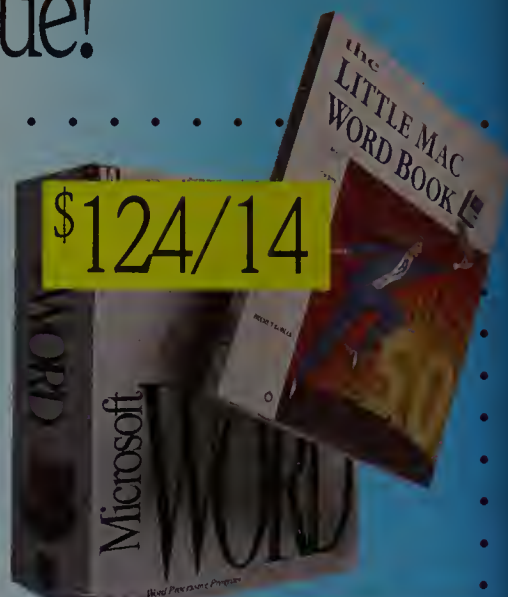
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Lotus Development 7 Upgrade your current spreadsheet (Excel, Wingz or Resolve) to the remarkable 1-2-3 from the leader in spreadsheet technology! Includes features like, AppleEvents and In-Cell Editing. Call for details on upgrading today!

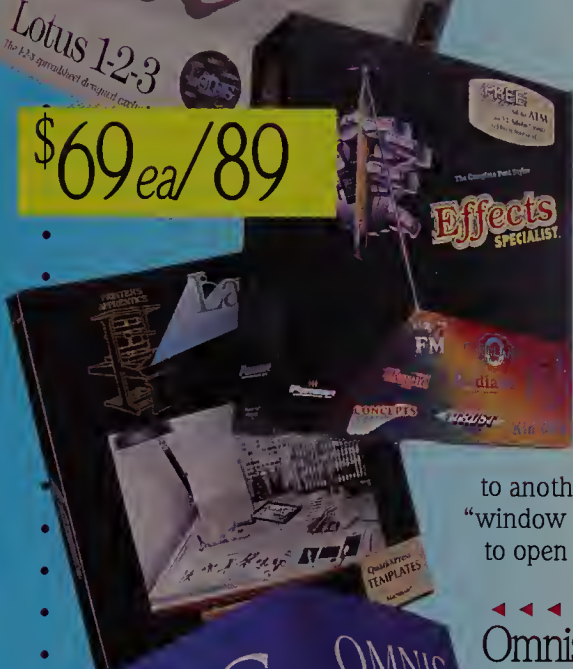


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Microsoft 7 Simplify using your existing MS Word by upgrading today to vers. 5.0. The ribbon control bar brings dozens of commands directly to your desktop. Too many features to list here. Call now for details.

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Effects Specialist/Layouts

Postcraft International 7 Effects Specialist transforms bitmap and PostScript fonts into sparkling headlines or eye-catching logos. Offers kerning and 120 different effects. Two different Layouts packages (Page-Maker or XPress) each offer over 200 DTP sample templates for ready-made solutions to typical business publishing problems.

On Cue II

ICOM Simulations 7 Move from one program to another instantly, bypassing the desktop maze, eliminating "window buildup", and ending the frustrating wait for folders to open and close. Works smoothly, quickly, and efficiently.



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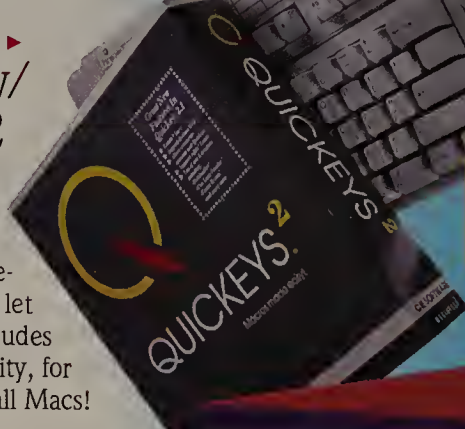


Omnis Seven

Blyth Software 7 Create industrial strength client/server applications that run identically on both Macs and PCs. Mac's Place agrees, there simply isn't a better tool available, "We use Omnis in every phase of our operation. It never let's us down and we've been programming with it since 1986." Call 1-800-34-OMNIS for more information.

Mac 101E Keyboard w/ QuicKeys 2

DataDesk 7 Improve your typing performance! Advanced keyboard utilizes the industry standard 105-key layout, with specially designed positive-tactile feedback keys that let you type faster with fewer mistakes. Includes QuicKeys 2.1, the popular keyboard macro utility, for even further functionality! Works with all Macs!



\$149

The Miracle Piano Teaching System

Software Toolworks 7 The first keyboard that teaches you how to play it! Makes learning the basics a pleasure. Professional keyboard with 49 standard-sized velocity-sensitive keys, 128 digitized instruments and sounds, with full MIDI-compatibility. Includes hundreds of songs and lessons and full orchestral accompaniment.

XPress 3.1

Quark Inc. 7 Many, many new features in Version 3.1, including Colors Palette and enhanced word processing (new time saving Tab Refinements and Style Sheets Palette). XPress is the best in advanced Desktop Publishing!



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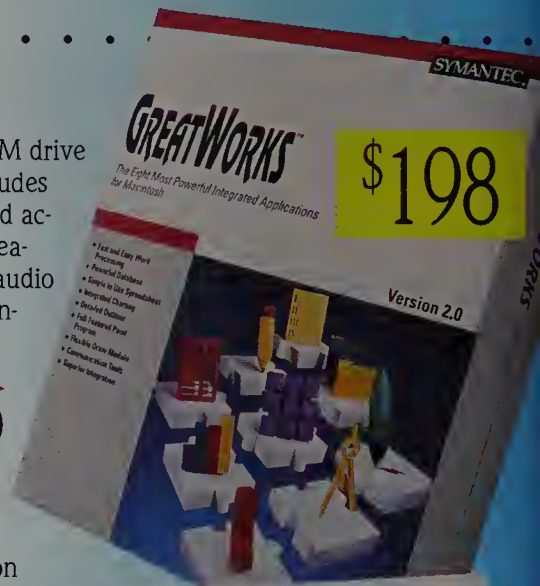
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GreatWorks 2.0

Symantec 700 The only productivity software you may ever need. Eight full-featured applications in one powerful, easy to use integrated program. You'll get started fast and keep working fast because common tasks are performed the same way in every module, saving you valuable time and money.



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Dove Computer 700 New Low price!. Dove, the leader and originator in desktop FAX/Modems just made their prime product more affordable. Includes a fully Hayes-compatible 2400 baud modem, Send and Receive FAX, PLUS unsurpassed voice mail capabilities. Automatically switches from Data, FAX and Voice.

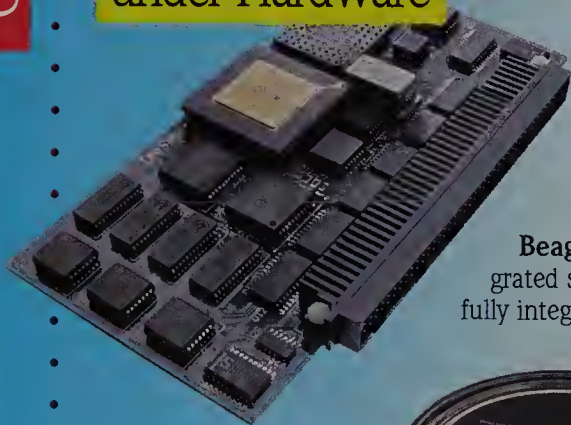
Frontier

UserLand Software 700 Now you can write scripts to drive graphics, page layout, file management, electronic mail, and utilities. You get over 100 sample scripts that you can use right away or modify. Customize, automate, and simplify the Mac operating system, file system, networks, and System 7 compatible applications.



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under Hardware



Universal PowerCache Card

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\$94

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Fractal/Wacom 700 Painter, the natural media painting program chosen by critics: MacUser Eddy 1991, 5-Mice, MacWeek's Target Award. The Wacom tablet has the premier pressure sensitive stylus. Now specially priced together.

Sweet 16

RasterOps 700 This high resolution screen delivers color graphics and images with superior definition. The black face plate enhances the contrast so colors are displayed more distinctly. High refresh rate renders the screen flicker-free to reduce eyestrain.



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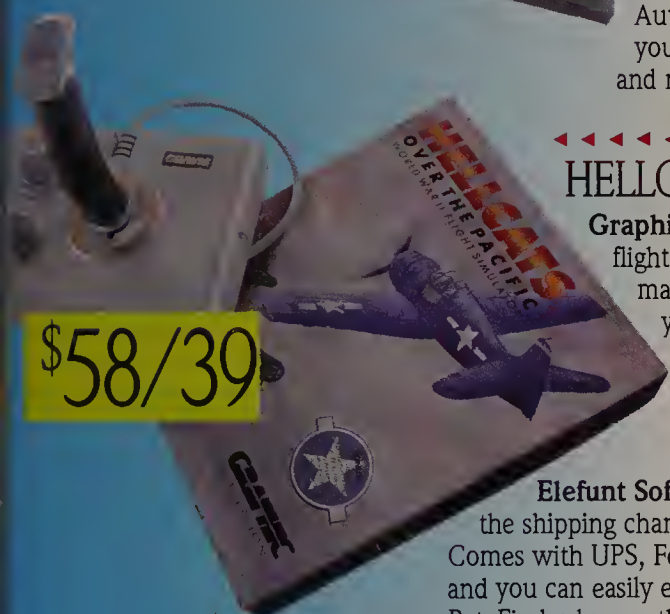
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Syquest 7 Having extra hard disk space has never been this inexpensive. Order one or order 20 for the same low price per cartridge. Ask for pricing on the new 88 megabyte removable cartridges.

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SuperMac 7 New! Make QuickTime movies on your Mac LC on up to the Quadra 900. Grab video from your VCR, camcorder or TV and pour it right onto your hard drive or optical cartridge. Import as high-image-quality digital data right into QuickTime applications and treat them just like text or graphics. Call for pricing and information today!

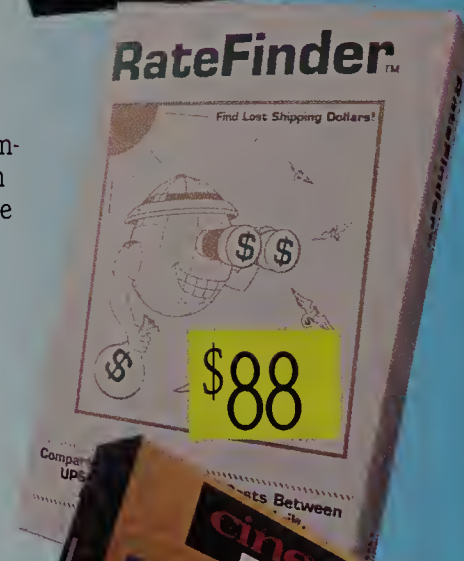
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Director 3.1

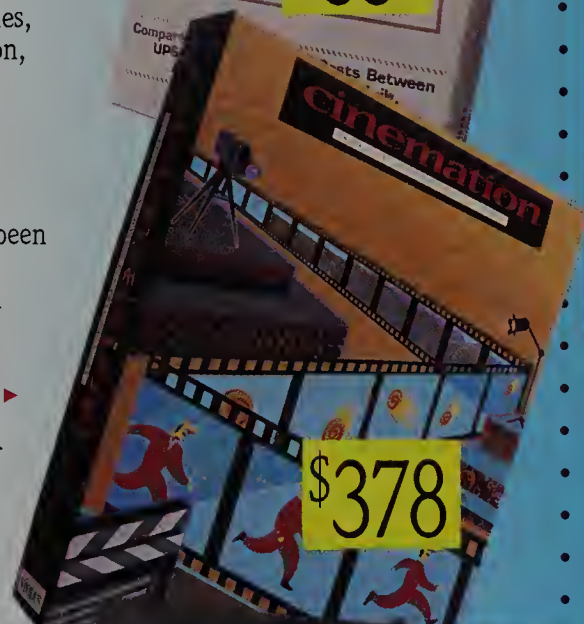
MacroMind/Paracomp 7 New vers. 3.1! The professionals choice for multimedia production is now the ultimate QuickTime authoring tool. Author, edit, playback and export interactive QuickTime movies with no additional hardware. Other features include expanded help, added functionality in the Score, a \$195 Accelerator and license free distribution of your multimedia productions.



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Apple

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Articulate Systems

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CoStar Corporation

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DataDesk

7 Mac 101E (All Macs) 126.

Fellowes Diskette Holders

7 Oak (Holds 45) 19.

7 Oak (Holds 120) 31.

InCom

7 Compu-Case PowerBook 8ag .. 78.

Kensington Microware

7 7' Long AD8 Keyboard Cable ... 24.

7 Turbo Mouse Adb 107.

Key Tronic

7 Mac Pro Plus 138.

L B Innovators, Inc

7 Red Charcoal or Navy Blue

7 WristSaver 12.

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Mac's Place

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Sony

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7 Double Sided-Bulk 50 Pak 33.

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7 OG 90 2gig DAT Tape 22.

Sophisticated Circuits

7 PowerKey 2.0 w/QuickKeys Lite 75.

BUSINESS

ACIUS

7 4th Dimension V2.2 518.

AEC Management Systems

7 FastTrack Schedule 1.5 135.

After Hours Software

7 Touch8ASE 79.

Aldus

7 Persuasion 318.

Ark Interface, Inc

7 Workspace 79.

ASD Software

7 Active Memory Single User .. 125.

7 Active Memory 5 User 314.

7 WindoWatch 88.

Attain Corp.

7 In Control 94.

Bananafish Software

7 ThoughtPattern 94.

Beagle Brothers Inc.

7 BeagleWorks 184.

7 Competitive Upgrade 94.

Calera

7 Wordscan 248.

Ceres Software

7 Inspiration 3.0.1 158.

CheckMark Software

7 Cash Ledger 112.

7 MultiLedger 2.0 225.

7 Payroll 174.

Chena Software

7 Fair Witness 1.1 315.

Claris

7 Claris Works 198.

7 FileMaker Pro 208.

7 HyperCard V2.1 139.

7 MacProject II V2.5 348.

7 MacWrite II 88.

CompuServe

7 CompuServe Membership Kit .. 25.

7 CompuServe Navigator 49.

Computer Associates

7 Cricket Graph 1.2.3 84.

DeltaPoint

7 DeltaGraph Professional 198.

DiscTech Corp.

7 Facilitator 218.

Freemove Company

7 White Knight V11 85.

Insignia Solutions

7 AccessPC 59.

SoftPC

7 Entry Level V2.5 125.

7 Universal V2.5 194.

7 AT V2.5 298.

Intuit

7 Quicken 3.0 39.

JIAN

7 BizPlanBuilder 94.

7 LivingTrustBuilder 94.

Lotus Development

7 Lotus 1-2-3 338.

7 1-2-3 Compet. Upgrade 98.

Micro Planning Intl.

7 Micro Planner Manager 378.

Microsoft

7 Excel 3.0 298.

7 Office V2.0 478.

7 Word 5.0 298.

7 Works 159.

New Era Software

7 nu8ASE Pro 1.5 248.

7 d8ASE to Pro 1.5 Upgrade 128.

Nolo Press

7 For The Record 21.

7 Will Maker 4.0 35.

Now Software

7 Up to Date (1 User) 64.

7 Up to Date (5 User) 258.

Paragon Concepts

7 Nisus 245.

7 Nisus Compact 98.

Pastel Development

7 DayMaker 58.

Portfolio Systems

7 DynoDex 2.0 69.

Prescience

7 Expressionist 77.

7 Theorist 245.

Reality Technology

7 Wealth Builder 94.

SoftSync

7 Accountant Inc. 338.

7 Accountant Inc. Multi-User ... 568.

Software Ventures

7 MicroPhone II V4.0 208.

Spider Island Software

7 TeleFinder Unlimited Ed. 272.

SuperOffice Corp.

7 SuperOffice 228.

Symantec

7 GreatWorks 2.0. 198.

7 More 264.

T/Maker

7 PowerBundle 158.

7 WriteNow 3.0 Call

Teleware

7 M.Y.O.B. 139.

Timeslips Corporation

7 TimeSlips III V2.1 192.

7 Accounting Link (TAL) 52.

Westware

7 Contact Ease V1.3 188.

Wolfram Research Inc.

7 Mathematica Standard 2.0 ... 498.

7 Mathematica Enhanced 2.0 .. 788.

WordPerfect Corp.

7 WordPerfect V2.1 278.

WordStar

7 American Heritage Dictionary . 62.

7 Correct Grammar 62.

Wyoming Software

7 Business Sense 1.5 124.

GRAPHICS

Adobe

7 Illustrator 3.2 w/ATM 2.0 368.

7 Photoshop 2.0 548.

7 Premier 308.

7 Streamline 2.0 117.

7 Type Manager 59.

Aldus

7 Freehand 3.1 388.

7 Gallery Effects 128.

7 Pagemaker 4.2 489.

7 Personal Press 2.0 Call

7 SuperPaint 3.0 128.

Altsys

7 Fontographer 3.5 258.

Ares Software

7 FontMonger 59.

Broderbund

7 Print Shop 35.

7 TypeStyler 2.0 128.

Calliscope Software

7 Satellite 3D 128.

Claris

7 Claris CAD 598.

7 MacDraw Pro 278.

Computer Associates

7 Cricket Draw III 168.

CoSA

7 PACo Producer 2.0 158.

7 PACo Producer Bundle 374.

7 XPlayPACo XCMD 158.

D'pux

7 FOLIO 1 344.

Delta Tao Software

7 Monet 198.

Deneba

7 Canvas V3.0 248.

Fractal Design

7 Painter 1.2 248.

Frame Technology

7 FrameMaker 594.

MacroMind/Paracomp

7 MacroMind Director 848.

7 Magic 248.

7 Model Shop V2.0 598.

7 Swivel 3D Professional 468.

MicroFrontier

7 Color It! 75.

Motion Works

7 ProMotion Call

PhotoDisc Inc.

7 PhotoDisc Vol A or B 198.

Pixar

7 Showplace/MacRenderMan . 629.

Quark Incorporated

7 XPress 3.1 548.

Ray Dream

7 JAG 68.

7 Ray Dream Designer 589.

Specular International

7 Infini-D 648.

7 Replicas Vol. 1 or 2 188.

Strata, Inc.

7 StrataVision 3D V2.5 628.

Timeworks

7 Publish It! Easy 145.

7 Competitive Upgrade 99.

Virtus

7 WalkThrough 308.

Vividus Corp

7 Cinemation 378.

CD-ROM

Agfa Corp.

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Cyan

7 Cosmic Osmo CD 39.

Discovery Systems

7 Berkeley 8MUG PD ROM 65.

7 Nautilus 8ackPac (1 or 2) 44.

7 Nautilus Starter Disc. 20.

FM Waves

7 DTPRO CD-ROM 75.

ICOM Simulations

7 Sher. Holmes Consult. Det. 45.

Optical Access

7 CD/Allegro (310 ms) 648.

7 Access CD 6/Pak 1198.

7 Access/MF Gigabyte 3248.

Magneto-Optical 3.5 Read/Write

7 RD/Aria-128 M8 1598.

Pixar

7 Showplace/MacRenderMan . 448.

Quantum Leap

7 CD-7 Super Library 2 Disk Set . 72.

7 Giga-ROM 2.0-Super Library ... 98.

7 Macademic-Education Library . 73.

EDUCATIONAL

Broderbund

7 Kid Pix V1.2 37.

7 Nigel's World 36.

7 Spelunx 29.

7 The Playroom V2.0 29.

7 Type! 18.

Compu-Teach

7 Destination: MARS! 38.

7 Once Upon A Time-Vol. I-III ea 34

Davidson & Associates

7 Alge-Blaster Plus 36.

7 Math Blaster Plus 36.

7 SAT Personal Trainer 36.

Knowledge Revolution

7 Interactive Physics 156.

Learning Company

7 Math Rabbit 35.

7 OutNumbered! 36.

7 Reader Rabbit 1 V3.0 35.

7 The Writing Center 50.

MECCO

7 Number Munchers 28.

7 Word Munchers 28.

7 Oregon Trail 28.

Nordic Software

7 Pre-Schoolpack 35.

7 Word Search Deluxe 35.

Software Toolworks

7 Mavis Beacon Typing 29.

ENTERTAINMENT

Baseline Publishing

7 Talking Moose 22.

Broderbund

7 Carmen San Diego?

7 Europe, Time, U.S.A., World ea.29

7 SimAnt 35.

7 SimCity 29.

7 SimCity Supreme 47.

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Spectrum Holobyte	
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7 Spectre	38.
7 Spectre LAN PAK (3 Nodes)	58.

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Asanté

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7 10T Hub/12	548.
7 MacCon3 IIs	248.
7 MacCon3 NB	218.
7 MacCon3 SE	218.
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7 EN/SC PowerBook	348.
7 EN/SC-10T	258.
7 EN/SC-10T PowerBook	288.

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Cayman Systems

7 GatorBox	1949.
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7 LabelWriter II Plus	298.

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7 ComboCache IIs w/FPU	328.
7 DualPort IIs w/FPU	168.
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7 6-MB Psuedo-Static	458.

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7 Spigot & Sound Pro NuBus	1698.
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7 Spigot NuBus	538.
7 Spigot Pro NuBus	1438.
7 Spigot si	538.
7 Spigot Pro si	1438.
7 SuperSqueeze	798.

Supra Corp.

Supra FaxModem

7 FaxModem Plus MacPac	198.
7 FaxModem V.32	328.
7 FaxModem V.32bis	378.

Supra Modem

7 2400	109.
7 MacPac 2400	138.
7 MacPac 2400 w/MNP 5	198.
7 Plus 2400 (MNP5, V.42 BIS)	158.

Thunderware

7 LightningScan Pro 256	489.
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UMAX Technologies Inc.

7 UC 630	1398.
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Wacom

12X12 Digitizers Cordless Stylus	
7 Standard	758.
7 Electro Static	836.
6 X 9 Digitizers Cordless Stylus	
7 Standard	518.

HARD DRIVES

DataPlace

All DP+ Drives come w/Mac Tools Deluxe & More Disk Space! They are tested and Pre-formatted. 2 year warranty.

External Hard Drives

7 DP+ 52-MB Quantum	338.
7 DP+ 105-MB Quantum	468.
7 DP+ 240-MB Quantum	828.
7 DP+ 425-MB Quantum	1398.

Internal Hard Drives

7 DP+ 52-MB Quantum	268.
7 DP+ 105-MB Quantum	398.
7 DP+ 240-MB Quantum	758.
7 DP+ 425-MB Quantum	1298.

Removable Syquest Hard Drives

7 DP+ 44-MB w/cartridge	508.
7 DP+ 88-MB w/cartridge	698.
7 44-MB Cartridges	68.
7 88-MB Cartridges	107.

Accessories

7 Mounting Bracket (Ilex/Ici)	19.
7 Case Opener/Torex Kit	8.

FWB Software

PowerBook Hammer

7 Hammer PB60	638.
7 Hammer PB80	788.
7 Hammer PB120	868.

PocketHammer

7 50-MB	568.
7 100-MB	768.
7 200-MB	1198.

Iomega

Bernoulli

7 Transportable 90-MB	798.
7 Kit w/MacTools Deluxe	38.
7 Kit w/Retrospect	98.
7 Single 90-MB Cartridge	139.
7 Tri-Pack 90-MB	408.

Quantum Drives

7 ProDrive LPS 52-MB	248.
7 ProDrive LPS 105-MB	378.
7 ProDrive 240-MB	738.
7 ProDrive 425-MB	1278.

Seagate Technology

Full Height Drive

7 WrenRunner II 676-MB	1998.
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MUSIC

Ars Nova

7 Practica Musica 2.3	68.
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Opcode Systems

7 Book Df MIDI	28.
7 EZ Music Starter Kit	155.
7 EZVision	98.
7 Galaxy Universal Librarian	188.
7 MIDI Translator	42.
7 Studio 3 MIDI/Smppte Intfc.	288.
7 Vision	368.

Passport Designs

7 MIDI Interface	78.
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PROGRAMMING

Bowers Development

7 AppMaker 1.5	214.
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Microsoft

7 QuickBASIC 1.0	68.
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Symantec

7 Just Enough Pascal	49.
7 THINK C 5.0	198.
7 THINK Pascal 4.0	159.
7 THINK Reference	69.

TGS Systems

7 Prograph V2.5	298.
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Zedcor Inc

7 ZBasic 5.0	95.
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BOOKS

Addison Wesley

7 Guide to Mac Family Hdw.	21.
7 Mac C Prog. Vol 1 or 2	19.
7 Mac Pascal Prog. Vol 1	19.
7 Macintosh Program Secrets	18.

Inside Out Series

7 Complete Book of HyperTalk 2	19.
7 Learn C w/Thin C Lite	28.
7 Mac Prog Guide MPW Vol 1	19.
7 ResEdit Complete w/ResEdit	23.

Bantam Books

7 HyperCard Handbook	21.
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Microsoft Press

7 MS Excel 3 Companion	20.
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Peachpit Press

7 Canned Art 2 ed.: Clip Art/Mac	24.
7 Canvas 3.0: The Book	14.
7 DataBase 101 W/ Demo Disk	14.
7 DTP Survival Kit	18.
7 Little Mac Book, 2nd ed.	12.
7 Little Mac Word 5 Book	14.
7 Little QuickKeys Book	12.
7 Little System 7 Book	10.
7 Macintosh Font Book	18.
7 PM 4: An Easy Desk Ref.	24.
7 QuarkXPress Book	20.
7 Real World Freehand	22.

Ventana Press

7 System 7 Book	18.
7 System 7 Companion Disks	12.

UTILITIES

Aladdin Systems

7 StuffIt Deluxe 2.0	59.
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Alsoft

7 DiskExpress II	55.
7 MasterJuggler	Call.
7 Power Utilities	Call.

Alysis Software

7 More Disk Space	48.
7 SuperDisk!	56.

ASD Software

7 FileGuard 2.7	129.
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Hand-Held Gray-Scale Scanner

LightningScan Pro 256

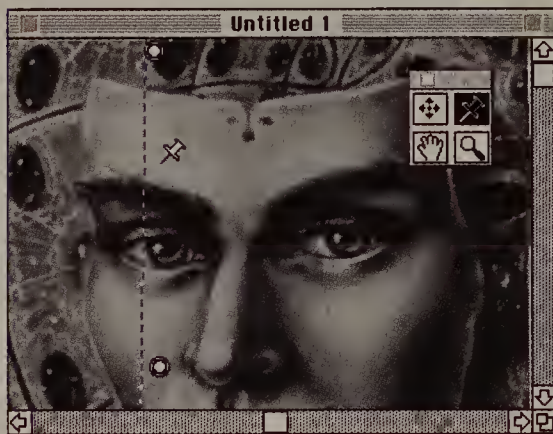
PROS: Creates 8-bit scans at up to 400 dots per inch; images scanned in two passes can be joined flawlessly. **CONS:** Large files scroll very slowly in ThunderWorks software. **COMPANY:** Thunderware (510/254-6581). **REQUIRES:** Mac Plus; 2MB of RAM; System 6.0.2. Recommended: 4MB of RAM; gray-scale monitor; 68020 or 68030 processor to run Enhance software. **LIST PRICE:** \$649.



THE LIGHTNINGSCAN PRO 256 IS an excellent piece of equipment. It does all Thunderware claims it can with hardly a hitch. It outperforms other hand-held gray-scale scanners and compares favorably with flatbed scanners that cost much more.

A true gray-scale unit, the LightningScan Pro 256 records images as wide as 4 inches, in 256 shades of gray, at up to 400 dpi. (The file for an 8-bit, 400-dpi image is large; you will need lots of extra RAM and hard drive space.) The LightningScan Pro 256 records grays directly—rather than using a dithering-interpolating scheme as some units do—resulting in the best possible scan. And increasing the resolution does not decrease the scan width.

Images wider than 4 inches can be scanned in several passes and then joined together using the remarkable ThunderWorks software. When you join two pieces, ThunderWorks temporarily turns the right-hand image into a flexible sheet. Using the Skoogy tool, you stretch the image to align with the left-hand image, fixing each properly matched segment with the Tack tool as you go. I scanned a 4-inch-wide halftone in two passes and joined the halves; the resulting image was virtually indistinguishable from the same halftone scanned in one pass. This is something other hand-held scanners cannot do. The software also lets users calibrate the scan head and compensate for normal manufacturing variations that might af-



Pinning It Down The right half of this image has been "Skoogied" into alignment with the left half and is being nailed into place with the Tack tool.

fect scanned images. ThunderWorks does have a few minor shortcomings. I found its memory partition needed to be at least 3.5MB. Large images scroll very slowly, and saving a TIFF file takes noticeably longer than in Adobe Photoshop.

The scan head has three controls—resolution, contrast, and output—as well as a light that warns you when you drag the scanner too fast. To help you make straight scans, there's a plastic guide that snaps onto the bottom of the scanner. The controller is a box roughly 6 by 8 by 2 inches; it has two 25-pin SCSI outlets, a SCSI ID switch, and an external power supply. Thunderware supplies a 25-pin SCSI terminator and a 25-to-25-pin SCSI cable. (If the scanner isn't the first item in a SCSI chain, you'll need a 25-to-50-pin SCSI connector.) The scanner and software are System 7-compatible and, according to Thunderware, 32-bit clean.

The LightningScan Pro 256 ships with MicroFrontier's Enhance gray-scale-editing software (a good low-cost product, but no match for Adobe Photoshop); Olduvai's Read-It OCR software; and a plug-in for scanning from within Enhance, Photoshop, Read-It, and Silicon Beach Software's Aldus SuperPaint and Aldus Digital Darkroom.

The LightningScan Pro 256 lists for about \$200 more than competing products, but it's such a well-executed product that it's worth the difference.—BILL JUSTIN

Shipping-Cost Tables

RateFinder 1.5

PROS: Facilitates shipping-rate comparisons; all-inclusive rate tables. **CONS:** Slow; numerous user-interface violations; weights must be entered in pounds or in ounces; manual lacks index. **COMPANY:** Elefant Software (510/843-7725). **REQUIRES:** Mac Plus; 2MB of RAM; 5MB free hard drive space. **LIST PRICE:** \$149.



GET A LOT OF EVALUATION SOFTWARE delivered by the friendly Fed Ex folks. Software publishers constantly use overnight-mail service, and they consistently choose the most expensive carriers. But who can blame them? Comparing shipping costs is a hassle, what with the myriad carriers, service classes, surcharges, discounts, and so on. RateFinder compares the costs of shipping via various carriers.

RateFinder comes with national and international rate tables for Federal Express, United Parcel Service (UPS), and the U.S. Postal Service for packages weighing less than 150 pounds. A sample Airborne Express rate table is also included, but it must be adjusted to reflect actual rates assigned by Airborne based on shipping volume. You

can also enter information for any other carriers, but the process is very tedious.

You enter your zip code (of the point of origin) plus the weight and destination of the package. Unfortunately, the method for entering weights is inflexible and clumsy, and you can't use the metric system.

Entering international destinations is also awkward. Domestic packages require only the five-digit zip code of the recipient, but for international packages you must enter the country's full name or select it from a pop-up menu with a clumsy Find feature.

After you enter the weight and destination, RateFinder consults its tables and displays the rates charged by the various carriers for different classes of service. On my Mac Ili, RateFinder took about 15 seconds to display information for a typical domestic package. RateFinder is no speed demon, but it's significantly quicker than flipping manually through several rate tables.

If the package doesn't meet a carrier's requirements, no rate appears for the invalid class of service. I'd prefer an option to hide invalid carriers and classes altogether. And there should be a way to list the carriers from the lowest to the highest rate.

Double-clicking on a carrier line in the Rate Shop window presents the Rate Totals window, where you can compute the total shipping cost, taking into consideration the charges for insurance, return receipts, and

pickups, as well as allowances for applicable discounts. A dimensional weight calculator allows you to enter in the package's height, width, length, and divisor (dimensional weight).

Because RateFinder was developed using Odesta's Double Helix, it is slow and has numerous user-interface violations (some windows that appear almost off the screen, nonstandard confirmation dialog boxes, radio buttons improperly used to initiate actions). Having worked with the initial release of RateFinder, however, I appreciate the effort the company put into improving the performance, simplifying the interface, and adding new features.

One particularly noteworthy new feature is the Rate Find window, where you can quickly look up a rate for a particular carrier. MacFederal and MacParcel (\$39.95 each from Computer:applications) offer much the same functionality of the Rate Find window, but handle only domestic Federal Express and UPS queries, respectively.

RateFinder beats the old-fashioned task of checking rate tables by hand. Even if you send only a few packages a week, RateFinder will pay for itself in less than a year's time by finding the least expensive way to ship. And given Elefant's track record of prompt upgrades, I expect RateFinder will significantly improve before that year is up.

—OWEN W. LINZMAYER

ComStation 2, ComStation 4

PROS: Chooser-selectable modem; personal phone books; simple, easy-to-use interface; Quick-Fax DA good for sending short, text-only faxes.

CONS: Incoming faxes are sent to fax manager; fax distribution needs fax program; uninformative error messages; ComStation 4 requires two Macs.

COMPANY: PSI Integration (408/559-8544, 800/622-1722; fax 408/559-8548). **REQUIRES:**

ComStation 2: Mac Plus; System 6.0.7 (hard drive recommended). ComStation 4: Mac Plus;

AppleShare server; AppleTalk network. **LIST**

PRICE: ComStation 2 \$599; ComStation 4 \$699.



ComStation 2



ComStation 4

USING A FAX MACHINE HAS BECOME as much a part of business as using the telephone. But who wants to go through the hassle of printing a document and taking it to a fax machine to send? ComStation 2 lets you send a fax directly from your Mac, and ComStation 4 provides network users fax capabilities. ComStation 2 is a solid product, but ComStation 4 has a few shortcomings, particularly in receiving faxes.

Both packages consist of a fax/data modem and fax software; ComStation 4 also has fax-server software. The modem is a standard 2400-bits-per-second data modem and 9600-bps fax modem that plugs into the serial port of the fax-server Mac or your Mac. To set up the ComStation 4 for network use, the fax-server Mac must have the FaxMonitor INIT installed. However, for other network users to send or receive faxes, they must have a fax folder in their name in the fax folder on the AppleShare server.

The software for sending and receiving faxes is the same for both ComStation 2 and 4. To send a fax, you simply select the NetFaxPrint (or FaxPrint for ComStation 2) icon in the Chooser and print the document as usual. The Mac converts the document to a bitmapped fax file as if you were printing the file. The NetFaxPrint (or FaxPrint) software then asks you to select a telephone number from your address book, or you can enter the name and telephone number of the recipient. Until the ComStation 4 FaxMonitor sends the file, fax files are stored in the fax folder bearing the sender's name, on the AppleShare server. The FaxMonitor INIT periodically checks each user's folder in the fax folder for documents waiting to be faxed, retrieves them, and faxes them to the appropriate telephone numbers.

Receiving a fax is a different story. All incoming faxes arrive at one location, the

FaxSpool folder on the ComStation 4 fax server. The server administrator must read each fax, using ComStation's FaxManager software, and send a copy of the fax to the appropriate user's folder on the AppleShare server. All this is fairly awkward; it would be easier if the recipient could use a Copy command within the FaxManager program so that the fax could be directed to the appropriate folder after viewing.

Once a fax is stored in a user's folder on the AppleShare server, the user can read the file using the copy of the FaxManager software. You can also store the fax as a TIFF or PICT file once it has been opened.

(With ComStation 2, sending and receiving faxes takes place in the background on your Mac; you can use the FaxStatus DA to monitor incoming and outgoing fax transmissions.) The ComStation 2 has well-designed fax software and a handy QuickFax DA for sending short memos as faxes.

ComStation 4's requirement of a separate fax server and file server is a distinct disadvantage; both functions should be on one Mac, or the FaxMonitor should be on the AppleShare server. ComStation 4's FaxManager interface is easy to use, and the QuickFax DA, which lets you send up to 255 characters of text as a fax, is handy for short faxes. But the process for distributing incoming faxes is still a bit awkward and needs some improvement.—DAVE KOSIUR

System-Security Tools

Citadel with Shredder

PROS: Feature packed; easy to use.

CONS: Passwords require at least eight characters; encrypted files must be removed from vaults before using them. **COMPANY:** Microcom (617/762-9310). **REQUIRES:** Mac Plus; System 6.0.

Recommended: Hard drive. **LIST PRICE:** \$149.95; five-user pack \$499.



CITADEL'S SECURITY TOOLS ARE designed to prevent unauthorized use of a Mac's drives and files. You can encrypt files, lock up hard drive volumes and removable media (SyQuest cartridges, for instance), prevent people from using the floppy drive, permanently erase sensitive documents, invoke a password-protected screen saver, and scan disks for viruses.

You can assign a separate password to each hard drive or removable. After locking a volume, there's no way to mount it on the desktop without knowing the password; even starting up from a floppy or carrying the drive or disk to a different Mac won't let you bypass the protection. You can also lock the floppy drive so that without the password, no one will be able to copy files to or

from the Mac. This option also helps protect your system from viruses.

Citadel enables you to create *vaults* for protecting sensitive files and folders. Each vault receives its own password and can hold as many files as the drive has space for. To open a vault, you simply double-click on its icon or use one of the Citadel utilities, and then provide the password. Files can be moved into and out of unlocked vaults as needed and encrypted with any of three data-encryption algorithms.

Citadel's screen locker blanks the screen to protect it from burn-in and also locks up the Mac. When the screen locker is active, pressing a key or using the mouse brings up a password screen. Users who lack the password are denied access to the Mac.

The program provides two ways to remove important files permanently from your disks. By overwriting deleted files with a string of zeros, Disk Cleaner makes it impossible to restore such files using a file-recovery program. The Shredder INIT (not to be confused with DLM Software's file-erasure utility Shredder) intercepts the Finder's Empty Trash command and asks whether you want to delete its contents manually or replace the contents with zeros; optionally, Shredder also handles files deleted from within programs, such as by using Microsoft Word's Delete command.

Citadel also includes a copy of the Virex

INIT, which can scan any file, folder, or drive for viruses; can automatically scan disks on insertion; can check each file as it's opened; and can scan at start-up or shut-down. Note that the INIT is for detection only. To remove viruses, you need a virus-protection utility.

Citadel has only two weaknesses. First, every password must be at least eight characters long. Second, encrypted files are inaccessible from the creator programs' Open dialog boxes. You must use Citadel, the DA, or the INIT to move the files to the desktop and then move them back into the vault after a save, which is a hassle. (During testing, I uncovered a bug. Closing the Shredder Options dialog box on a Mac Plus running System 7 causes the screen to lock and the system to crash. This does not occur on other configurations.)

Citadel provides an emergency access procedure: the Administrator disk can open any Citadel-locked drive, even if you've forgotten the password. Since it can bypass all passwords, it should be treated with the same respect as the passwords themselves—don't leave it lying around.

Overall, Citadel's utilities are extremely easy to use and appear to cover all bases, from a security standpoint. Having multiple methods to access vaults and lock drives increases the convenience of using Citadel, too.—STEVEN SCHWARTZ

HyperCard-Based Book

The Complete Annotated Alice

PROS: Contains "lost" out-of-print chapter; large-print option. **CONS:** Slow; reading may strain eyes; no index to illustrations; quickly discharges battery. **COMPANY:** The Voyager Company (310/451-1383). **REQUIRES:** Mac SE/30; 640-by-400-pixel monitor; System 6.0.7; HyperCard 2.1. **LIST PRICE:** \$19.95.



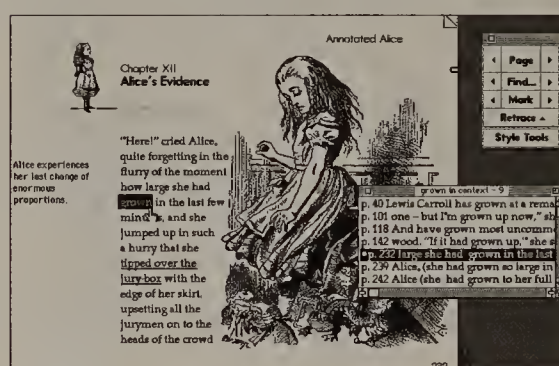
THE COMPLETE ANNOTATED ALICE is one of three Expanded Books published by The Voyager Company especially for PowerBook users. It consists of *Alice in Wonderland* and *Through the Looking Glass*, integrated with Martin Gardner's *The Annotated Alice* (New American Library, 1960) and *More Annotated Alice* (Random House, 1990). Dedicated Carrollians will rejoice at the inclusion of a famous "lost" episode available only in this HyperCard edition. Alice comes compressed on a 1.4MB floppy disk; decompressed it consumes nearly 2MB of hard drive space. It requires HyperCard 2.1 (the run-time version that comes with the PowerBook works fine).

This story is about my adventures in Alice's newly computerized world, and what

I saw there. Alice opens briefly to the book's pleasant "cover" artwork, then to the table of contents. The keyboard arrow keys let you leaf through 60 pages of prefaces and introductions and then on through the two Alice books. You can also click on a chapter title to go directly to that chapter.

Carroll's prose and Sir John Tenniel's illustrations appear murky compared with my freshly typeset \$2.50 paperback edition (Bantam, 1981). This is not necessarily a complaint, because most users of the Expanded Books version will probably play with Alice rather than read it. Reading anything on screen for a long time is fatiguing, but the Expanded Book's most annoying quirk is its slowness, even on a PowerBook 170.

To be fair, the electronic version does let you set bookmarks, go directly to a page,



Getting around Wonderland Handy tools let you type notes, open annotations, dog-ear pages, attach paper clips, and find words in context.

and monitor your progress with a progress gauge. In the wide white margin you can type notes or mark passages with black lines. Still, reading from the screen felt claustrophobic. I never got the satisfying sense of being transported that reading customarily inspires.

The product succeeds as a type of literary hypertext hide-and-seek. Underscored words and phrases indicate hot buttons that are linked to annotations. Click on one and the annotation appears. You can search for key words within the text and annotations. Pressing on any word reveals a pop-up menu that lets you search for the word's next, last, or every occurrence, in context if you like. These features make it easy to bounce between words, annotations, and books.

Alice demands nearly continuous hard drive access. Set to rest after 30 seconds of inactivity, my hard drive awakened whenever I turned a page, selected an annotation—did anything involving a command. Beginning with a fully charged battery, I was able to use Alice for about 90 minutes.

To my mind, Alice's most significant feature is the large-print option, which simply changes the screen font to an easier-to-read 18-points. Thanks to this, the visually impaired can more freely journey to Wonderland. Amazing how a few hundred extra dots can change a person's view of the world. Applause, Voyager.—JOE HUTSKO

Network-Management and Paging Utility

NetWorks 1.0.1

PROS: Uses little system memory; versatile; flexible. **CONS:** None. **COMPANY:** Caravelle Networks Corporation (613/596-2802; fax 613/596-9659). **REQUIRES:** Mac Plus; System 6.0.5. **LIST PRICE:** 20-device version \$495; unlimited devices \$1195; TCP/IP Protocol unlimited devices \$1995.



SO YOU GET THIS SOFTWARE TO monitor your busy network. The box pictures an executive type sitting at a table with a steaming cup of coffee and a pager in her hand. She looks relaxed, in control. Immediately you think, "What do I have in common with this woman? Not a bead of sweat rolls down her face." After using NetWorks, I know why she is so imperturbable—NetWorks works. It's easy to use, flexible, and it doesn't require a lot of system resources.

The main window has six buttons that enable you to quickly configure NetWorks: Add, Remove, Start, Stop, Get Info, and Attach. When you click on the Add button, NetWorks quickly scans the network for network devices. Built-in, customizable filters let you select only the devices you want

to add. On-screen status lights indicate if devices are Up, Down, Not Tested, or On Hold (useful for out-of-service equipment).

Waiting for that Down indicator to flash is obviously impractical. NetWorks' alternative is to attach a notification to any or all of the selected network devices. There are six notification methods: a simple message on your computer; an electronic message sent via modem; a recorded message; an audio message; an E-Mail message; and a pager notification. You can customize notification messages, or use NetWorks' default message, which includes the device name, the zone, and the time the device went down. These messages can be collected in a log or exported to a spreadsheet, database, or word processor for detailed evaluation of equipment performance.

Zone Name	Device Type	Device Name	DN	OH	UP	NT
Publish Edit	FastPath	Publish FastPath				
6th Floor	FastPath	Shared Svcs FastPath				
Macworld Edit	FastPath	Macworld Edit				
Twilight Zone	FastPath	Twilight Zone				
Macworld Edit	LaserWriter	LaserWriter IIg #2				
4th Floor	LaserWriter	SunWorld Marketing				
4th Floor	LaserWriter	SunWorld IIG				
4th Floor	LaserWriter	SunWorld Art				
Ethernet	LaserWriter	SPARCprinter				
Ethernet	LaserWriter	Mac Art & Design IIG				
Macworld Edit	Macintosh SE/30	LaserWriter IIg #2				
Macworld Edit	NameServer	MacEdit Mail Center				
		MacWorld Edit Pages				

The Big Picture NetWorks' main document window transforms you into a network demigod with omnipresent capabilities over network devices.

You can decide when and how often you want to be disturbed . . . er, ah . . . notified—when the network device or service goes down, goes up, or both. You can set notifications to go off at different intervals depending on the importance of a device. For example, for a rarely used printer you could set NetWorks to notify you with a screen message after 5 minutes and a pager message when the device is down for 30 minutes. For a critical file server you have to set an immediate notification via pager.

I used the Motorola Advisor paging service (approximately \$20 per month) with NetWorks and it was terrific. After working out a few technical problems with the paging company (setting the baud rate, for example), I felt I knew exactly what was happening on the network at all times. If you decide to use a pager with NetWorks, I suggest an alphanumeric pager that allows a few lines of display; a strictly numeric pager doesn't give you enough information.

NetWorks uses only 256K of RAM, although it allots 512K, and it can run in the background under MultiFinder, or be hidden in System 7.

The documentation is concise and well written; the baud rate information should be included in the manual, however. NetWorks might seem pricey, but eliminating end users' calls makes it worth its weight in gold.—MATTHEW R. CLARK

Arcade-Style Game

Creepy Castle

PROS: Clever use of classic Hollywood horror films; good manual. **CONS:** Poor performance; limited scenarios; copy protection. **COMPANY:** Reactor (312/573-0800). **REQUIRES:** Mac Plus; System 6.0; hard drive. **LIST PRICE:** \$49.95.



WHILE I LIKE THE IDEA BEHIND Creepy Castle—combating early Hollywood black-and-white horror-movie ghouls in order to save the beautiful (if scantily clad) woman kidnapped by the mad doctor—I didn't much like playing the game. The author, Bill Appleton, who is best known for his HyperCard and SuperCard accomplishments, has built performance delays into your stockily built character, Melvin "T-Bone" Powers, that make for less-than-great arcade response. Pauses for punches or cowering spells, where T-Bone gets the heebie-jeebies, leave you helplessly open for attack.

When battling the more ominous creatures, such as the Werewolf, the Bride of Frankenstein, or the Mad Scientist himself, I felt a little like a dog lifted out of a swimming pool—my legs were kicking like crazy,

but I wasn't going anywhere. I would give my worthy opponent a Van Damme-esque flurry of punches and flying kicks without anything happening, only to expend all my limited energy like a whirling dervish once the nasty was gone and the keyboard caught up with me.

Creepy Castle has four scenarios: the Woods, where wolves and ravens stalk; the Graveyard, where the dead rise again; the Castle, where vampires haunt the halls; and the Dungeon, where the doctor unleashes his best creations. In addition, the game has four skill levels—beginner, intermediate, advanced, and expert. On the higher levels you face the same nasties—they're just stronger and faster—and Melvin's poor performance is intolerable. If the game were a bit more varied and clever, rather than lim-



Bats in this Belfry One holds the key you need to enter the dungeon.

ited to a few formulaic scenarios, the play would be less frustrating. Your only hope is the banes—such as wolf's bane, holy water, and garlic—which destroy all the opponents in sight. Good luck even picking them up on the expert level.

The sound effects, reminiscent of Spaceship Warlock's, are good, and the characters look great (except for the rats—I hate rats—and I'm not so sure about the beautiful woman).

Two other redeeming features are in the manual. Delightful tidbits of horror-movie trivia from 15 Hollywood classics provide the copy protection for Creepy Castle, and four riddles make up the hint list that sheds light on the tricks for defeating the Super Ghoul at the end of each scenario.

Besides the performance issues, Creepy Castle could be improved by adding more scenarios, such as a labyrinth or a tomb, and different tricks for each scenario at the higher skill levels. A special key on the keyboard should be used to pick up banes. And I think a gray-scale version for color and gray-scale monitors would give the game an appearance and feeling more like the old movies.

The folks at Reactor have put out some great stuff, and I look forward to their future offerings; but Creepy Castle's limitations outweigh its merits, and I would not spend my hard-earned dollars on it.—TIM WARNER

Collaborative Software

Aspects 1.01

PROS: Good control of simultaneous multiuser access to documents; offers both individual and linked views of a document. **CONS:** Lacks outlining and spreadsheet modules; limited import facilities for word processing documents. **COMPANY:** Group Technologies (703/528-1555). **REQUIRES:** Mac Plus; any network or a modem; System 6.0. **LIST PRICE:** Version 1.02 \$299; 5-pack \$895; 10-pack \$1295; 100-pack \$7995.



ASPECTS PROVIDES THE TOOLS for a group of 16 workers to collaborate and generate ideas over a network, or for 2 participants to work together via modem. Participants can work with text and bitmapped or object-oriented graphics. Changes made to Aspects documents automatically appear to all the participants in the current session. You can create documents during a session, or you can import Microsoft Word (versions 3.0 and 4.0), MacWrite II, MacWrite 5.0, ASCII, PICT, and MacPaint files.

The organizer, or moderator, of a session decides who participates and to what extent each participant can change the docu-

ment. The moderator chooses one of three mediation levels: Free For All, Medium, and Full. The Free For All level lets all participants edit a document at the same time. Medium mediation allows only one participant at a time to edit a document, although participants can edit other documents belonging to the session while someone is editing the main document. Full mediation allows only one participant at a time to make changes to any of the Aspects documents belonging to the session. The moderator decides who can edit a document and can assign or withdraw edit control.

When you're working in Full or Medium mediation, icons appear in a floating Conference Tools window to let you know whether or not you can edit the document. An upraised hand means it's not your turn to edit, the pen-in-hand means you can edit, and a closed pen means you cannot edit the document. To request edit control, you click on the closed pen. A list of participants can be displayed as a pop-up menu from within the Conference Tools floating window.

Having several people edit one document is chaotic. Aspects gets around this problem in several ways. Each participant uses a unique pointer that appears to the other participants; unfortunately, you can't tell which pointer belongs to whom. Aspects also limits multiuser editing according to the type of document being worked on. If

you're working in Free For All level on a word processing document, only one user can work in a given paragraph at a time; in a Draw document, the object one participant is working on cannot be altered by other users till the first person is done with that object (in a Paint document, however, there is no such locking).

Participants see only one screenful of the document they are working on, even though other participants might be working on other sections of the same document. But to ensure that all participants are viewing the same thing, Aspects has a Linking Views option. With Linking Views invoked, the person editing a document controls the other participants' screen—as the editor scrolls through a document, the other participants' windows scroll accordingly.

Aspects presents a reasonably-easy-to-understand interface for group work and handles many joint-editing conflicts. Aspects is best for preparing reports and simple presentations that require a group effort. It provides limited support for brainstorming sessions, since it includes no outlining functions. Reports creation is also limited, since Aspects has neither a table function nor a spreadsheet-import option. If you plan to do lots of brainstorming or need to use other programs, such as a spreadsheet, using Farallon's Timbuktu is a better choice.—DAVE KOSIUR

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When it's time to get your technical drawings done, you need a tool designed specifically for the task at hand. You'll find MacDraft's finely crafted drawing tools incredibly easy to use, powerful and amazingly accurate. In addition, most tools provide a number of options that will allow you to tailor the tool to meet your drawing needs. For example, with a simple click of the mouse, you can choose to draw arcs by their radius, any 3 points or even draw an elliptical arc.

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For information on MacDraft for Windows:
Circle 229 on reader service card

Look It Up!

BY DAVID POGUE

THE CONDEMN ALOFT, SWALLOW it or nay, is what you blarney anon you suffer a brace of Raincoat thesauruses whorish on *this* doom.

The sentence above, believe it or not, is what you get when you let a couple of Macintosh thesauruses loose on *this* sentence. Which just goes to show ya: you are still the brains of the operation; an electronic reference book can only make suggestions.

But lately, companies are making a lot of dictionaries, and the dictionaries are getting smarter. These online dictionaries and thesauruses are abridged, of course, so as not to completely engulf your hard drive; otherwise, they're twice as good as their physical counterparts—faster, easier to use, and paper-cut-free.

American Heritage Electronic Dictionary

THIS ELECTRONIC DICTIONARY/THESAURUS desk accessory (Wordstar International, \$99) was obviously prepared by some big-time word nerds: the definitions are generous, juicy, and painstakingly crafted. Entry words are in bold, parts of speech are italicized, and there's plenty of what graphic designers call white space in the window, making AHED the easiest-to-read dictionary on the market. Like all electronic references, AHED also lets you look up a word *within* a definition by double-clicking. Or click on Thesaurus, and get a screenful of synonyms (see "Words at Work"). You can also work in reverse, for those moments when you know there's a word for something, but your brain's just not operating—you can type in a couple of words you think would be in the definition (like *influence* and *payment*), and let AHED find the entry for you (*kickback*).

AHED's Mac integration, alas, has some woeful drawbacks. For example, its nine files (3MB total) must live in the System Folder—loose and cluttered. More astonishing: AHED has virtually no interaction with your word processor. (Other programs can look up a highlighted word in a document, and automatically replace it with a synonym you select.) You can copy and paste single

words to and from AHED, but—and this is a big but—you can't copy *definitions*.

Still, AHED remains the word lover's dictionary of choice—with its built-in anagram maker (which tells you that *emanate* is a scrambled *manatee*), how could it not be? And believe it or not, AHED is the only electronic dictionary that shows you pronunciations—a critical feature for those of us who talk.

Funk & Wagnalls Standard Desk Dictionary

THE FUNK & WAGNALLS (INDUCTEL, \$79.95) has no thesaurus, anagram module, or pronunciation guide. (You really miss that pronunciation guide, too—how else do you settle the argument about whether it's *harass* or *harass*?) It displays a glitch or two under System 7. And this dictionary, like AHED, requires you to type (or paste) the word you want defined—it can't look up a highlighted word unless you're in System 6 and MultiFinder. (A new version is en route, which has System 7 features, autolookup of a highlighted word, and that anagram thing.)

Sounds wretched, right? It's not. Its definitions are less attractively displayed than AHED's, but there are many more entries—nearly 5.5MB's worth. (Inductel claims it has 103,000 definitions, but I stopped counting at around 25.) You get to choose the font for the display. And F&W searches are much quicker than AHED's.

Finally, Inductel includes a set of secondary dictionaries that give the F&W more breadth than its rival: Computer Terms, Gazetteer (place names), Abbreviations, Biographies, and so on. The entries therein are a bit abrupt (United States: "country, North America; pop. 226,545,805; cap. Washington."), but they're nice to have online. If you're a System 7 user, steer clear until the update appears; if not, get AHED for eloquence and the thesaurus, or F&W for speed and word count.

Word Finder Plus 4.0

WOULD YOU BELIEVE THAT this 1 million-word thesaurus (Microlytics, \$69.95) takes up less than 300K of disk space? I

have *no* idea how they did that. But it's the right idea—and the only option for use with a Mac PowerBook.

Highlight a word in any program and choose Lookup from the Word Finder Plus menu. After a moment, a list of synonyms appears, grouped by shade of meaning. Microlytics touts its sophisticated autoinflection feature, which automatically displays words that match the part of speech and tense of the selected word. (In the olden days, a search for *eating* gave you synonyms like *devour*, *munch*, and so on—without the *-ing*.) Sorry to burst Microlytics' bubble, but every thesaurus I could find (except Microsoft Word's) does autoinflectioning.

No, what really makes Word Finder Plus attractive is its smart word selection. While it produces far fewer synonyms than Thunder 7 does, the ones it does display are much more useful. (Even so, in my unscientific test of ten words, WF+ produced almost four times as many synonyms as did Word or AHED.) A simple double-click returns you to your word processor, where the original word is replaced. At 290K and under \$70, this is a slick little package.

Thunder 7 1.0.5

WHAT'S A SPELLING CHECKER DOING here? It turns out Thunder 7 (Baseline Publishing, \$99.95) is a thesaurus too. It works just like Word Finder Plus, except you get scads more synonyms. They're sort of hard to read, since there are no blank lines between groups, and ugly underlining mars the type. (Yo, Baseline! We use italics now!) But what's nice about Thunder's search results is that the words aren't simply grouped by shade of meaning; each meaning-group gets a definition (as they do in the American Heritage thesaurus).

There are lots of nice things about Thunder-the-spelling-checker, of course—its glossary feature is the coolest—but the thesaurus can be pretty dumb. Some of the thesaurus's synonym-group definitions sound like they

continues



*Electronic
dictionaries and
thesauruses
get language
under control*

came from a Monty Python skit: for *fish*, the program comes up with "one who is victimized or made to look foolish." For *blood*, Thunder's first definition is "a man who is conspicuously fashionable." And my personal fave: Thunder's first-choice definition of *mouse* is "a woman who is a man's usual or preferred companion." Well, maybe for Mickey. Thunder misses other boats, too—like *boat*, which produces no synonyms at all. (Word Finder Plus offers *vessel*, *skiff*, *ship*, and so on.) Sometimes you can find what you are looking for way down the list—and sometimes not (*storm* offers several meaning groups, none of which refers to the weather). I don't know what Thunder 7's thesaurus is thinking, but maybe it ought to read the dictionary.

Rhyme Design 2.1

YES, THERE'S AN IMPERFECT RHYME IN the very title of this rhyming dictionary (Rapture Studios, \$89.95). But by golly, the thing really works: type in a word, get a list of words that rhyme with it. If you enter a word with alternate pronunciations, like *wind*, the program smartly asks you whether it sounds like *blind* or *grinned*.

Rhyme Design's most disappointing quirk is that it only rhymes one-syllable words. You can't enter *bubble* and get *trouble*. Then, too, there are some odd missed opportunities: *list* doesn't give you any past-participle rhymes like *missed*. And I guess I have to mention the copy protection, although I understand the impulse—when your market is the handful of Mac-owning lyricists, even one illegal copy can be 5 percent of your potential sales. But hey—in the next version, gimme two-syllable rhymes and better spelled-different/sounds-alike support, and I'll persuade the rest of the handful to buy.

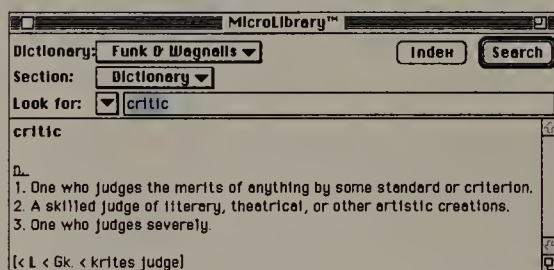
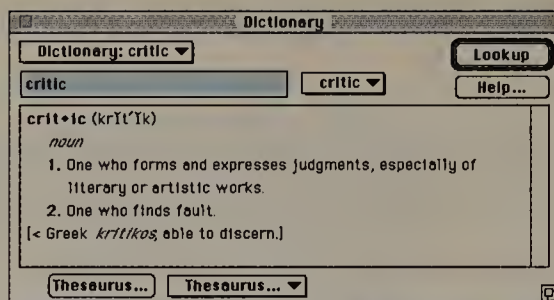
The Random House Encyclopedia 1.0

DIDN'T PEOPLE ALWAYS SAY, "SEE THIS floppy disk? You could fit the whole encyclopedia on one of these?"

WORDS AT WORK

Thesaurus	Meaning groups	Synonyms
Roget's	3.4	70.3
Word	1.2	5.5
AHED	1.2	5
Thunder 7	1.5	25.7
Word Finder Plus	2.1	18.7

Ten words were flung at each program; this table shows the average number of meaning groups and synonyms offered per search. The hardbound *Roget's Thesaurus, Fourth Edition* is shown for comparison (not shown: the *quality* of synonyms). The test results, including the actual words, are downloadable from the Macworld section of America Online.



AHED and Funk Both online Mac dictionaries are excellent for different reasons. The American Heritage dictionary (top) contains a more attractive layout, complete with pronunciation and a direct line to a thesaurus. The Funk & Wagnalls definitions are sometimes more complete, and there are more total entries.

In reality, it takes seven floppies to hold this encyclopedia (Microlytics, \$119). It's exactly what you'd hope for: type in a topic, or some keywords, and get a list of encyclopedia entries that match. Considering that the program has several million years' worth of events to cull, the searches are remarkably quick. The articles, though rarely as long as a page, are nonetheless thoughtful, painstakingly nonpartisan, and unbelievably succinct.

Even at 5MB how could a program possibly give appropriate coverage to every major event, person, concept, and place? Somehow RHE comes close; my searches were fruitful about 90 percent of the time. The only holes are some weird choices in recent American culture: entries for Oprah but not Donahue; the Beatles but not Michael Jackson; acid rain but not AIDS. (The encyclopedia is current to 1989.)

You can copy an article to the Clipboard, but it's in that gross format where there's a carriage return at the end of each line. Otherwise, RHE is one Really Handy Encyclopedia.

Correct Quotes 1.0

OH, GIMME A BREAK. WORDSTAR INTERNATIONAL is selling a HyperCard stack for \$49.95? How good could a famous-quotations stack be?

Well, better than you'd think. Six thousand quotations may not sound like many, but the people in charge of content have made some creditable choices. For each topic (from Ability and Absence through Zeal and Zest), you get a couple screens of quotations (and their authors); profundity outweighs wittiness, but you can find both if you're patient.

Suppose you're writing a speech about the Apple-IBM joint venture, and you want to open with a zinger. You might search for *cooperation*, which would yield this: "Great discoveries and improvements invariably involve the cooperation of many minds" (Alexander Graham Bell). Nah. So you'd check out the *compromise* card, and find "Compromise is never anything but an ignoble truce between the duty of a man and the terror of a coward" (Reginald Wright Kaufman). Hmm. That ought to get them buzzing.

This stack would be four times better if it were twice as well-stocked. Still, you can always add your own choice of quotations and topics; as Charles Caleb Colton said, "Where we cannot invent, we may at least improve."

Microsoft Word 5.0

THE BEST THING ABOUT WORD'S NEW built-in thesaurus is that it's built-in, and you don't pay extra for it. It's extremely simple to use: highlight a word (or don't even bother—Word will look up the word closest to the cursor), choose Thesaurus, and a double list appears. On the left, you see a list of meaning groups (for *water*: *liquid* [noun] and *irrigate* [verb]); on the right, a list of synonyms for the currently selected meaning (for *liquid*: *rain*, *ice*, *pond*, and so on).

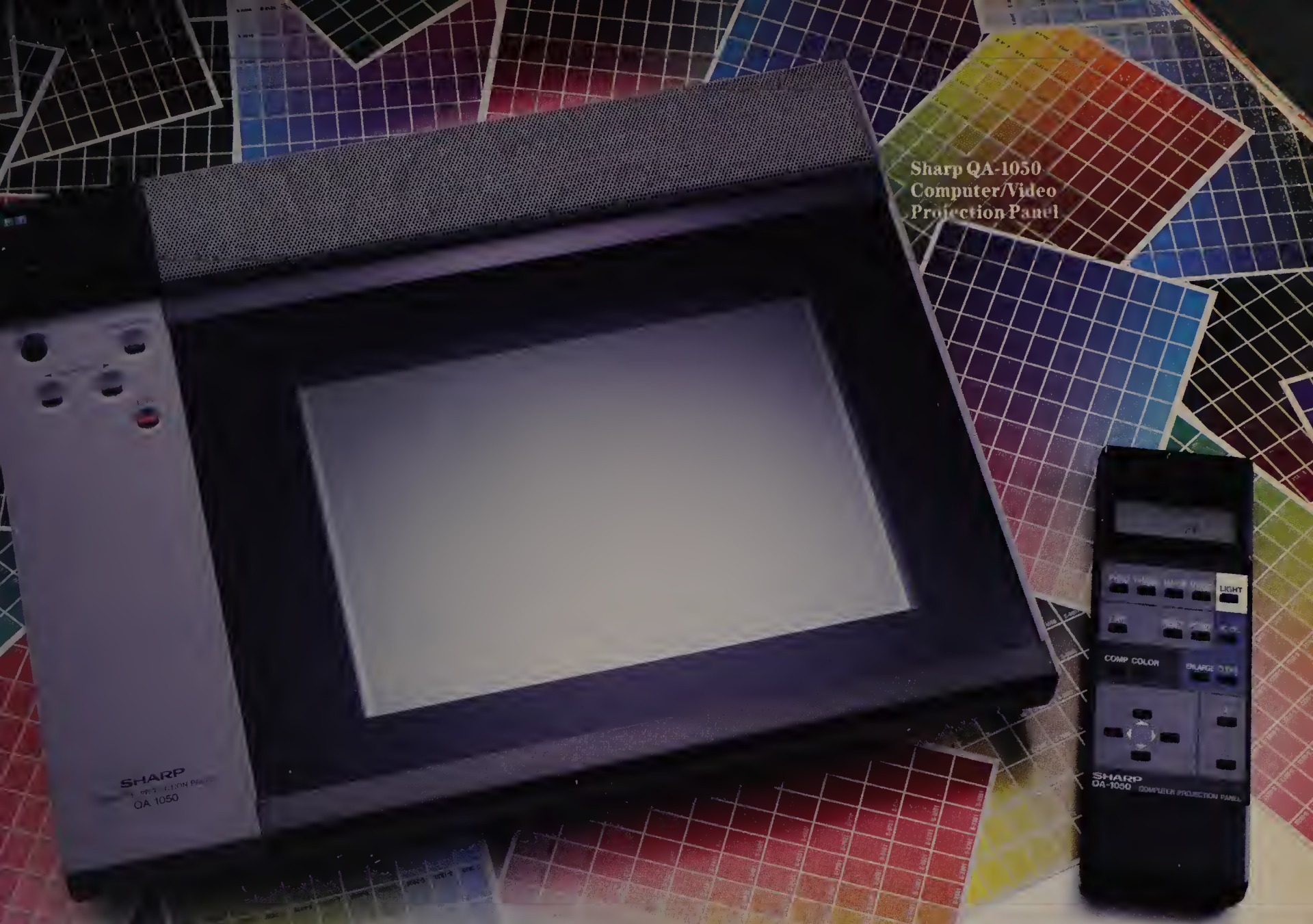
While the synonyms it produces are remarkably usable, Word's thesaurus is highly wimpy in sheer word count (see "Words at Work"); you simply get fewer choices. If you care at all about word power, here's a tip: trash the 386K U.S. English Thesaurus from the Word Commands folder; use Word Finder Plus instead. You get five times as many words—for 150K less disk space.

The Upshot

THERE ARE A COUPLE OF DELIBERATE omissions: BigThesaurus and Spelling Coach Professional (Deneba Software) and Language Master (Franklin Electronic Publishers) are getting major overhauls and weren't available for this column. In the meantime, however, I slightly prefer the American Heritage dictionary, despite its "I don't have to interact" attitude, and Word Finder Plus for a thesaurus. We don't have much market choice in encyclopedias, quotation collections, or rhyming dictionaries—fortunately, there's one of each, and they're just fine (*agreeable*, *bright*, *good*, *pleasant* . . .). **m**

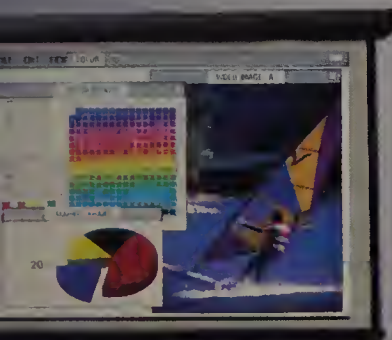
See *Where to Buy* for contact information.

Contributing editor DAVID POGUE is a writer (one who engages in literary composition) and a New Yorker (one who avoids eye contact with strangers).



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—Joseph Schorr, Macworld, April '92

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Everything you could want in a fax/modem. All the style of Xeba—complete with software, cables and power supply. 9600 send and receive fax with 2400 bps/ V.42 bis modem. List: \$429

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Note: We're adding two exciting new capabilities, concurrent voice communication and caller identification. These features are not yet available from any modem manufacturer, but as soon as the technology permits (estimated to be third quarter of '92), we will offer it in an easy upgrade to our Xeba line. Caller identification may not be allowed in all states.

New Products

The Latest Macintosh Releases

EDITED BY EVAN COOPER

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HARDWARE

10T Hub/8

An eight-port 10BaseT Ethernet concentrator that automatically shuts down a bad port when jamming signals are detected, thus isolating network failures. In addition to the eight RJ-45 ports, the product includes a BNC port for connecting thin coaxial cable, and an



10T Hub/8

in/out selectable UTP port for connecting to other hubs using unshielded twisted-pair wiring. \$399. Asanté, 408/752-8388; fax 408/734-4864.

16-Inch Trinitron Display

Color monitor that offers a screen resolution of 832 by 624 at 72 dpi, a screen refresh rate of 71Hz, and a universal power supply. The 16-inch display is coated with OCLI anti-



16-Inch Trinitron Display

glare treatment, has a tilting swivel base, and works with the built-in video on the Quadra 700 and 900, LC, IIsi, and Ilici. \$1299. MirrorTechnologies, 612/633-4450, 800/654-5294; fax 612/633-3136.

Accel-a-Writer 8000

A laser printer based on the Canon SX print engine and the PhoenixPage PostScript interpreter with a user-selectable resolution from 300 by 300 pixels to 600 by 600 pixels, and 35 resident fonts. The printer incorporates the company's Virtual Disk technology, which uses the product's 512K of on-board memory as a virtual disk to store additional fonts. It also has a SCSI port for adding a hard drive, and comes with 6MB of RAM upgradable to 16MB. \$4495. Xante, 205/476-8189; fax 205/476-9421.

Acecat

A digitizing tablet that uses electromagnetic inductive technology and supports resolutions of up to 1000 lines per inch. Product weighs 1.2 pounds and comes with a stylus for use on the



Acecat

tablet; a serial interface cable; and a 5-volt power adapter. \$149. Acecad, 408/655-1900, 800/676-4223; fax 408/655-1919.

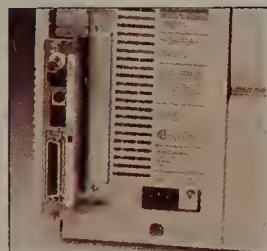
Art-Getter

A three-pass charge-coupled device (CCD) scanner that scans line art at up to 2400 dpi and in 24-bit color and

gray-scale at 600 dpi. The device is built around a UMAX Technologies scanner engine and takes documents up to 8½ by 14 inches. Adobe Photoshop 2.0, Adobe Streamline, a driver for Caere's OmniPage, and a plug-in module for Photoshop are among the software included. \$2795. DPI Electronic Imaging, 513/474-4028; fax 513/474-4028.

BridgePort EX

A board that fits into the expansion slot on the HP LaserJet IIsi printer to allow nonnetworked DOS PCs, networked PCs, and Macintoshes on EtherTalk or AppleTalk to share the same printer. The board features Automatic Lan-



BridgePort EX

guage Switching, a technology that determines whether an incoming print job is PostScript or PCL and automatically configures the printer to the appropriate language; product also supports 10BaseT and thin-coaxial connections. \$995. Extended Systems, 406/587-7575, 800/235-7576; fax 208/377-1906.

CirrusOptical

External, magneto-optical drive that uses cartridges that are identical in size to a floppy disk, but each has a 128MB capacity. The company claims the drive has a 45ms average seek time. Includes Silverlining drive-management software, 5MB of public domain shareware, and one blank cartridge. \$1699. La Cie, 503/691-0771,

800/999-0143; fax 503/691-5590.

DOSFloppy Drive

An external SCSI floppy drive that allows the Macintosh to access files from 1.2MB and 360K 5.25-inch DOS-formatted floppy disks. Using AccessPC and SoftPC from



DOSFloppy Drive

Insignia Solutions, the user can read and write directly to DOS-formatted disks using a Mac. \$599. PLI, 510/657-2211, 800/288-8754; fax 510/683-9713.

EN+

A multiport Ethernet wide-area network router for integrating remote LocalTalk and EtherTalk networks into an existing backbone; router can connect up to four remote locations via digital phone services. User can choose between 10BaseT and BNC Ethernet connections on the unit, and wide-area connections are made via standard V.35, RS-232, RS-449, and X.21 interfaces. The



EN+

box is based on a Motorola 68000, has a battery backup to protect the unit's memory, and uses programmable gate arrays for hardware upgrades. From \$2995, depending on number of ports. Engage Communication, 408/688-1021; fax 408/688-1421.

Fax2800DI

A plain-paper laser fax machine that can serve as a stand-alone Group III fax, or as a fax terminal on a network with the use of Ricoh's ImageNet software (available for \$395). For network use, the fax machine communicates at 19.2 Kbps and can use a networked computer's memory for tasks such as automated document distribution, and image storage and retrieval. The product has a 126-number autodialer and a 30-page automatic document feeder and prints at resolutions up to 196 by 392 lines per inch. \$4995. Ricoh, 201/882-2000; fax 201/882-2506.

Flex 8 LC and Flex 8 si

8-bit graphics boards for the Mac LC and IIsi that provide 16 different sets of resolutions up to 1152 by 882 pixels and that support monitor sizes of up to 21 inches. The boards feature hardware-based pan and zoom, allowing the user to enlarge images on screen by up to 200 percent above an application's enlargement capabilities, and display 256 colors or shades of gray. \$999 each. Nutmeg Systems, 203/966-3226, 800/777-8439; fax 203/966-7972.

HP EtherTwist 28692A ThinLAN Hub Plus

A multiport, thin-coaxial repeater for use in Ethernet and IEEE 802.3 local area networks; supports SNMP/IP and IPX-based network management. The hub has nine thin-coaxial ports and one AUI port for connection to thin- or thick-coaxial, fiber-optic or twisted-pair cables. Status LEDs on the device aid in troubleshooting; using SNMP-

based network-management applications from HP or other vendors, network managers can configure, monitor, and control the hub remotely or from a station on the network. \$2900. Hewlett Packard, 415/857-1501, 800/752-0900.

IDSQ Series

External, removable-cartridge drives with Winchester drive mechanisms, available in 44MB and 88MB formats with a 1:1 interleave ratio. The 5¼-inch drives feature a 20ms average seek time, according to Identity, and a 1-year warranty. 44MB \$999; 88MB \$1499. Identity Systems Technology, 214/235-3330, 800/723-8324.

Infinity MaxOptical 1GB

Magneto-optical drive that uses a proprietary method of disk formatting called zoned constant angular velocity (ZCAV) that allows the drive to use 1GB cartridges; drive also accepts standard ISO/ANSI 600MB cartridges. Using ZCAV, the drive adds more sectors of information to the storage medium's data tracks as they get farther from the center of the platter, allowing for the 1GB capacity. The company claims the MaxOptical has an average access time of 48ms. \$5699. PLI, 510/657-2211, 800/288-8754; fax 510/683-9713.

LM-300

A hand-held laser barcode scanner that connects through an ADB port and weighs less than 11 ounces. Software allows the user to program prefix and suffix characters and bar-code formats. The device sends scanned bar codes directly *continues*

to any application. \$1395. TPS Electronics, 415/856-6833, 800/526-5920; fax 415/856-3843.



LM-300

MacRecorder

Sound System Pro

System for use with Macintoshes with a 68020 or faster processor. Includes a MacRecorder (audio digitizing hardware) and SoundEdit Pro (software for recording, editing, and integrating sound into other applications). Software enables user to record directly to disk, input sound from any device compatible with the Macintosh Sound Input Manager, save sounds at 8-bps or 16-bps sample sizes, and sample sounds at any rate up to 48kHz. \$349. MacroMind Paracomp, 415/442-0200, 800/248-4477; fax 415/442-0190.

MicroPorte 4232bis

A V.32bis portable modem that weighs 10 ounces and that company claims can achieve throughputs of up to 38,400 bps. Product supports MNP 10 protocol, which regulates transmission speed and packet size, allowing the modem to stay connected over poor-quality cellular or land-based lines. The modem also supports MNP 2-4 error control, MNP 5 and V.42bis data compression, and other modulation standards. Includes an AC power pack and rechargeable batteries. \$899. Microcom, 617/551-1000; fax 617/551-1007.



MicroPorte 4232bis

MMU/LC

A Memory Management Unit (MMU) board for the Mac LC; supports virtual memory and can be

equipped with an optional math coprocessor. The board can be disabled from the Mac's Control Panel. \$149; with math coprocessor \$248. System Technology Corp., 904/428-0411, 800/638-4784; fax 904/428-0765.

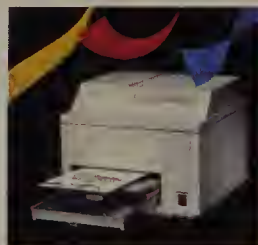
Nexus fx

A 68030 accelerator with a clock speed of 50MHz or 55MHz, a 128K SRAM cache, and a 68882 math coprocessor also running at 55MHz. Both the 68030 and the 68882 have heat sinks, and the RAM cache is matched to the 55MHz clock rate. Accelerator must be factory-installed by company. 50MHz version \$895; 55MHz version \$1295. Perspect Systems, 310/821-7884, 800/736-1546; fax 310/827-5360.

Phaser II PXe

A color thermal-wax transfer printer that implements Adobe Systems' PostScript Level 2 software, prints at 300 dpi, and has parallel, serial, and AppleTalk ports so the printer can be shared

over a network. The printer also supports HPGL and ships with TekColor PS, a software utility that improves the color accuracy of output from common applications. The printer can be upgraded for Ethernet connectivity by installing the company's 4511A interface. Comes with 17 Adobe



Phaser II PXe

fonts and 4MB of RAM; can be upgraded to 8MB for an additional \$995. An optional font SIMM with 22 more Adobe fonts is priced at \$595. \$4995. Tektronix, 503/685-3585, 800/835-6100; fax 503/685-3063.

Plus Drive

A high-density, 3½-inch external disk drive that formats, reads, and writes 1.44MB, 800K, and 400K Macintosh disks. Drive



Plus Drive

does not need the SWIM chip upgrade required when installing an Apple SuperDrive. Device uses a Sony drive mechanism and also works with 720K and 1.44MB MS-DOS-formatted disks using a Mac-to-DOS transfer program. \$449. Applied Engineering, 214/241-6060, 800/554-6227; fax 214/484-1365.

Pocket BulletModem P9696MX

A 6½ ounce, wallet-size portable modem that sends faxes and data at 9600 bps and supports V.42bis, V.32bis, V.22bis, v.22, and MNP 2-5 protocols. The device also supports MNP Class 2 and 3 faxes and comes with QuickLink fax software. The modem can be powered by an AC adapter or batteries.

\$745. E-Tech Research, 408/730-1388; fax 408/730-2488.

Quicktel M9696XV

Send/receive fax and data modem (both at 9600 bps) that supports V.32, V.42, V.42bis, and MNP 5 protocols. Eight lighted icons on the modem's front panel display modem status information. Comes with Faxstuff and QuickLink II communications software and is available in black or platinum gray. \$599. Logicode Technology, 805/499-4443; fax 805/499-8588.



Quicktel M9696XV

ScanMate

A color drum SCSI scanning device that scans at 2000-dpi, providing 4096 shades of gray and 36-bit output. The product can scan art from 35mm to A4 (8.25-inches by 11.63

Used Regularly, Prevents Unwanted Conflict Build-up.

Why wait for your Mac to bomb when you can keep it running smoothly with Help!™? Help! is a configuration problem solving utility. It's the first intelligent Macintosh program which pinpoints conflicts, incompatibilities, and other problems and tells you how to fix them.

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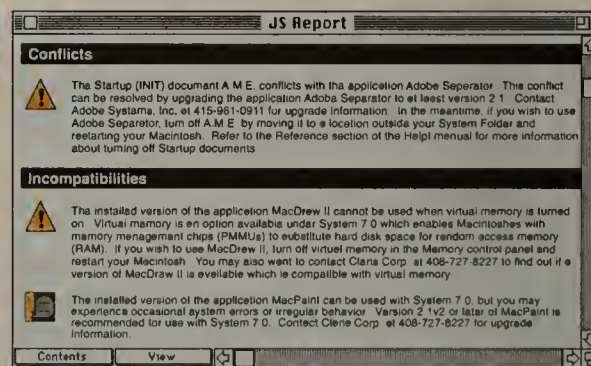
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Help!
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Teknosys inc.

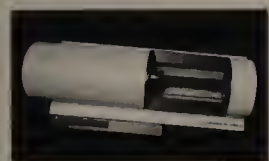
3923 Coconut Palm Drive
Suite 111
Tampa, FL 33619



"This impressive technical-support program belongs in the shirt pocket of every system administrator." — MacUser Magazine 4/92

Circle 142 on reader service card

-inches) format and can take negatives, transparencies, reflected art, and line art as input. Software includes a plug-in for Photoshop and ColorStudio that allows scans to be input directly into these programs and lets the user adjust scanning parameters in a low-resolution preview phase. \$29,995. Danagraf, 314/535-8807, 800/535-7689; fax 314/535-9829.



ScanMate

Spectra Star Model 450

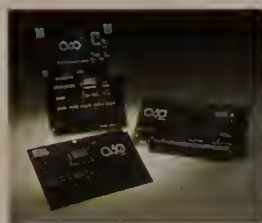
A color thermal-wax printer with a built-in 32MB hard drive and a desktop film recorder attachment that produces PostScript-compatible 35mm color slides. The product is based on a RISC processor and also prints 300-dpi color prints and overhead transparencies. \$14,990. General Parametrics, 510/524-3950; fax 510/524-9954.

SupraFaxModem V.32bis

Fax and data modem with Group III fax compatibility, MNP Class 1 and Class 2 commands, and a data-transmission rate of up to 14,400 bps. Modem also supports V.42bis, MNP 2-5, and MNP 10 data-compression and error-correction protocols. The status display shows up to 25 different messages, and a firmware upgrade scheduled for release in mid-1992 will enable modem to include voice and caller-ID features. \$399.95. Supra Corp., 503/967-2400; fax 503/967-2401.

TokaMac ci 25i

Processor Direct Slot (PDS) accelerator for the Mac IIci; utilizes the 68LC040 version of the Motorola 68040 processor (the 68LC040 does not include a built-in math coprocessor). The product installs in the cache slot of the IIci, has an on-board cache, and processes 20 MIPS. Three software programs included in the package let the user control the board's functions



TokaMac ci 25i

and switch between the board's 68040 and the host computer's 68030. \$1695. Fusion Data Systems, 512/338-5326; fax 512/794-9997.

Triam Grayscale Monitor

A gray-scale, 15-inch monitor with a 680-by-870-pixel (80-dots-per-inch) resolution and a refresh rate of 75Hz. The product comes with a 4-foot video cable and a 1-year warranty; monitor is compatible with power sources from 110V to 230V AC. \$499. APS Technologies, 816/478-8300, 800/235-2752; fax 816/478-4596.

TVT-3000

An active matrix LCD projection panel that can display 262,144 colors with a 640 by 480 resolution and a contrast ratio of

100:1. The product features a built-in loop-through function (so the user can see the image on the monitor and the projection screen simultaneously), a remote control for image adjustments, and on-screen setup menus. \$5995. In Focus Systems, 503/692-4968, 800/327-7231; fax 503/692-4476.

Viper Drive

A floptical disk drive that is capable of reading and writing high-density (1.44MB) disks as well as very-high-density (20MB) floptical disks. Available as an internal version for the Quadra 900 and an external SCSI version. The product comes with the necessary cabling on the external version, plus one preformatted floptical disk. The driver software included allows the user to configure media diagnostics, change the drive's interleave ratio, and partition and password-protect the drive. Internal \$595; external \$695. Second Wave, 512/343-9661; fax 512/343-9663.

SOFTWARE

Business GuardDog

A collection of over 60 policies and procedures designed to help managers uncover and prevent business losses from employee carelessness and theft. Policies are geared specifically toward manufacturing and distribution companies and cover a variety of operations including accounting, data processing, inventory, and shipping. Information is presented in 16 chapters that are formatted and saved in popular word processing programs so the text can be edited and pasted into company employee manuals. 1MB min. memory. \$159. Jian Tools for Sales, 415/941-9191, 800/346-5426; fax 415/941-9272.

CAD to Mac

An application that imports HPGL plotter files from any CAD package and converts them into PICT format for pasting into other programs. The software can print imported files and has edit-

ing capabilities that include image rotation, dragging, and resizing. Product includes a serial cable and an adapter for connecting CAD stations on other platforms to the Mac. 1MB min. memory. \$495. Select Software, 513/733-6300; fax 513/733-6365.

CameraMan

An INIT that allows a user to capture screen activity into a QuickTime or PICS file for use in training, instructional media, and product demonstrations; the product records screen activity, including menu access and cursor movements, and works in all color modes and on all screen sizes. Movies can be captured at frame rates up to 30 frames-per-second and can include the full screen, a selected screen area, or a selected area around the cursor. 2MB min. memory. \$149. Vision Software, 408/748-8411, 800/800-8476; fax 408/748-9584.

Cinematic

An application for creat-

ENGINEERS & SCIENTISTS: SIMPLICITY IS POWER!

HiQ is the first software environment that integrates all the tools you need to solve Real World engineering problems:

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Actual screen shots from top:

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- 2) HiQ's Problem Solvers automatically generate HiQ-Script code along with numerical or graphical results to a problem.
- 3) HiQ dynamically links HiQ-Script to all data in a project.



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ing interactive presentations with animation, sound, and QuickTime movie clips. Software includes a 24-bit paint program, a stand-alone application for playing back Cinematic movies, and a MovieWindow XCMD for playing and controlling presentations from within HyperCard. The program's AutoMotion feature lets users import Microsoft PowerPoint and Aldus Persuasion files and add motion to them, and a ghosting command displays any series of movie frames through a transparent easel so the user can paint in-between frames or align objects in context. Comes with 12MB of clip animation, templates, and sounds. 1MB min. memory. \$495. Vividus Corp., 415/494-2111; fax 415/494-2221.

CMaster

A program that installs into Think C version 4.0 or 5.0 and adds tools for editing code in C, including an icon bar, a menu bar, and keyboard commands, all of which can be

customized. The program also allows you to add markers to code, save window positions in memory, and has parenthesis-kissing capabilities. 2MB min. memory. \$69.95. Jersey Scientific, 212/736-0406; fax 212/947-4981.

Communism and the Cold War

An interactive educational videodisc with accompanying software that was developed by ABC News InterActive and the Florida Department of Education. The videodisc provides information on communism in Eastern Europe and the former Soviet Union and a chronology of events leading to the breakdown of communism in these regions. It also includes case studies on regional con-



Communism and the Cold War

flicts and proxy wars, and it has a video glossary as well as biographical information. The videodisc is narrated in Spanish and English and is close-captioned for hearing-impaired students. It includes bar-coded lesson plans and a printed directory. \$618.75. Optical Data Corp., 908/668-0022, 800/524-2481; fax 908/668-1322.

DateBook

A personal organizer that creates and organizes to-do lists, has scheduling and reminder features, and can search and print. The product integrates with the company's contact-management application, TouchBase, to import contact information from existing TouchBase files. Schedules can be viewed by year, month, week, and day, and in text, Gantt chart, or time-bar format within each view. 2MB min. memory. \$125. After Hours Software, 818/780-2220; fax 818/780-2666.

FaxOCR

A software package that

recognizes faxes received at both 200-by-200 and 200-by-100 resolutions, and converts them to text format. According to press materials, the product converts a one-page document to text in less than 30 seconds. Converted documents can be saved in Word, PageMaker, and other popular formats. 2MB min. memory. \$199. PSI Integration, 408/559-8544, 800/622-1722; fax 408/559-8548.

Font Sampler

A program that runs in HyperCard 2.1 (included) and lets the user print out sample sheets and keyboard maps for any fonts that are installed in the user's system. Sample sheets can be customized to contain a phrase of the user's choosing. 1MB min. memory. \$19.95. Daedalus Scientific Software, 718/423-3881; fax 718/423-3881.

FrontCard

A HyperCard-based programmer's tool for creating front ends for mainframes that includes a

3270 terminal emulator and XFCNs and XCMDs for the development of HyperCard applications. The functions provided in the package are 3270-specific and let the user transfer files, modify terminal settings, remap keyboards, read and write function keys to the host session, and check for host error messages. The software requires a MacMainFrame Workstation or Gateway product to operate. 4MB min. memory. \$2495. Avatar Corp., 508/435-3000; fax 508/435-2470.

Half-QWERTY

Software for configuring a standard Macintosh keyboard to work as a one-handed keyboard by superimposing the keys on the right side over the keys on the left in a mirror image. By pressing a modifier key, user can switch between left- and right-side keys. User can touch-type with one hand while using the mouse with the other. 2MB min. memory. \$79.95. The Matias Corp., 416/749-3124.

Heaven & Earth

A game with three segments that can be played separately or combined to form a fourth module called The Pilgrimage. The three modules are the Heaven & Earth card game based on the Japanese game Hanafunda, played with 48 cards of 12 suits; The Illusions, which has four levels, each having 13 types of brainteasers; and The Pendulum, a series of 12 animated simulations. 1MB min. memory. \$59.95. Buena Vista Software, 818/841-3326, 800/688-1520; fax 716/873-0906.



Heaven and Earth

IcePick

A view editor and development environment that allows MacApp programmers to quickly see and change view hierarchies, run programs to test views, and select multiple objects. This prototyping



Rub lamp and say:

"I want vivid color from an affordable printer."

"I want vivid color from an affordable printer."

"I want vivid color from an affordable printer."

If that doesn't work call 1-800-835-6100, Dept. 22C.

The Phaser™ II PXe color printer produces 16.7 million of the world's brightest, most vivid colors. It prints at 300 dpi onto transparencies or paper using PostScript Language-Level 2. It works with PC or Mac applications, it's fast, it's networkable and at \$4995, unexpectedly affordable. Rub for awhile, then call.

Tektronix

tool also lets users align objects, use constrained dragging tools, and use the arrow keys to nudge objects and views 1 pixel at a time. 1MB min. memory. \$149.95. ExIS, 415/493-2000; fax 415/855-9222.

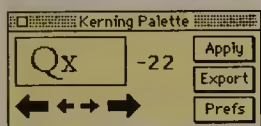
Incubator

A program that allows the user to create customized TrueType fonts by modifying existing ones. The user can adjust a font's lightness and darkness, width, contrast, and slant; the application then styles the new font and saves it as a TrueType file. The application can also read .AFM metric data and apply it to any font, or create new .AFM data for newly created fonts. 2MB min. memory. \$149.95. Type Solutions, 603/382-6400; fax 603/382-4839.

The Kerning Palette

A QuarkXtension that allows the user to edit kerning tables for fonts from within QuarkXPress using a floating palette that displays selected letter pairs with their current kerning value and lets the user edit

the values for problem pairs. Modified kerning tables can be stored in suitcase files or in the XPress preferences file



The Kerning Palette

using Quark's proprietary method of storage. Tables can be output as text files. 4MB min. memory. \$295. Clearface, 212/529-4362, 800/538-6779; fax 212/673-0114.

LibraryBrowser

An online public-access program designed to replace traditional card catalogs and assist users in searching library catalogs built with LibraryWorks. The program accepts full Boolean searches of call numbers, authors, titles, subjects, and keywords. Records can be displayed in card format or in short, medium, or long report formats. After the program has been inactive for a predefined length of time, all fields are automatically cleared. A lock

feature prevents users from quitting the program without a password. 1MB min. memory. \$195. Caspr, 408/446-3075, 800/852-2777; fax 408/446-1574.

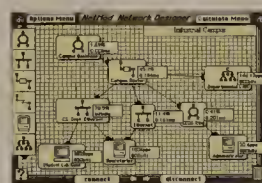
MacNumerics-II

An application that allows the user to input data using mathematical notations found in textbooks and create graphs that can be edited, labeled, exported, and printed. On-line help screens and a Show Steps function aid students in understanding mathematical concepts and problem solving. Program can graph conic sections, matrices, polynomials, and polar equations, among other things. Designed for use by high school, junior college, and university students. 2MB min. memory. \$289.95. Spring Branch Software, 319/927-6537.

NetMod

A network modeling tool that enables network designers to generate complex configurations and evaluate a variety of design alternatives. The

program was created in HyperCard and comes configured with the operating characteristics for numerous network technologies as well as vendor-specific network devices. NetMod applies mathematical models that use closed-form analytical techniques to calculate component utilization, throughput, and packet delays, and it can create model networks with



NetMod

more than 50,000 nodes. 1MB min. memory. Single-user versions are \$250 for academic users and \$500 for commercial users. University of Michigan Software, 313/936-0435; fax 313/936-1330.

Office-Wiz

Office-management software with 16 modules designed to handle all computerized tasks for a small office. Functions in-

clude the ability to track clients and projects, schedule and record activities, monitor time for billing purposes, generate management and accounting reports, and print checks. The program also has bookkeeping and accounting capabilities, creates multiple invoices, and prints form letters and envelopes. 4MB min. memory. Single user \$695; multiuser package \$1495. Oryx Associates, 415/563-9971; fax 415/563-0238.

PacerForum

A conferencing application that runs as a desk accessory for distributing information, group brainstorming, collaborative design, and project planning; essentially works as a local bulletin board service. The conference area is organized into a set of bulletin boards—each with one or more supervisors. Users can arrange and view bulletin boards by priority. Messages may include any combination of text, graphics, Macintosh files, and sounds; users can select from a va-

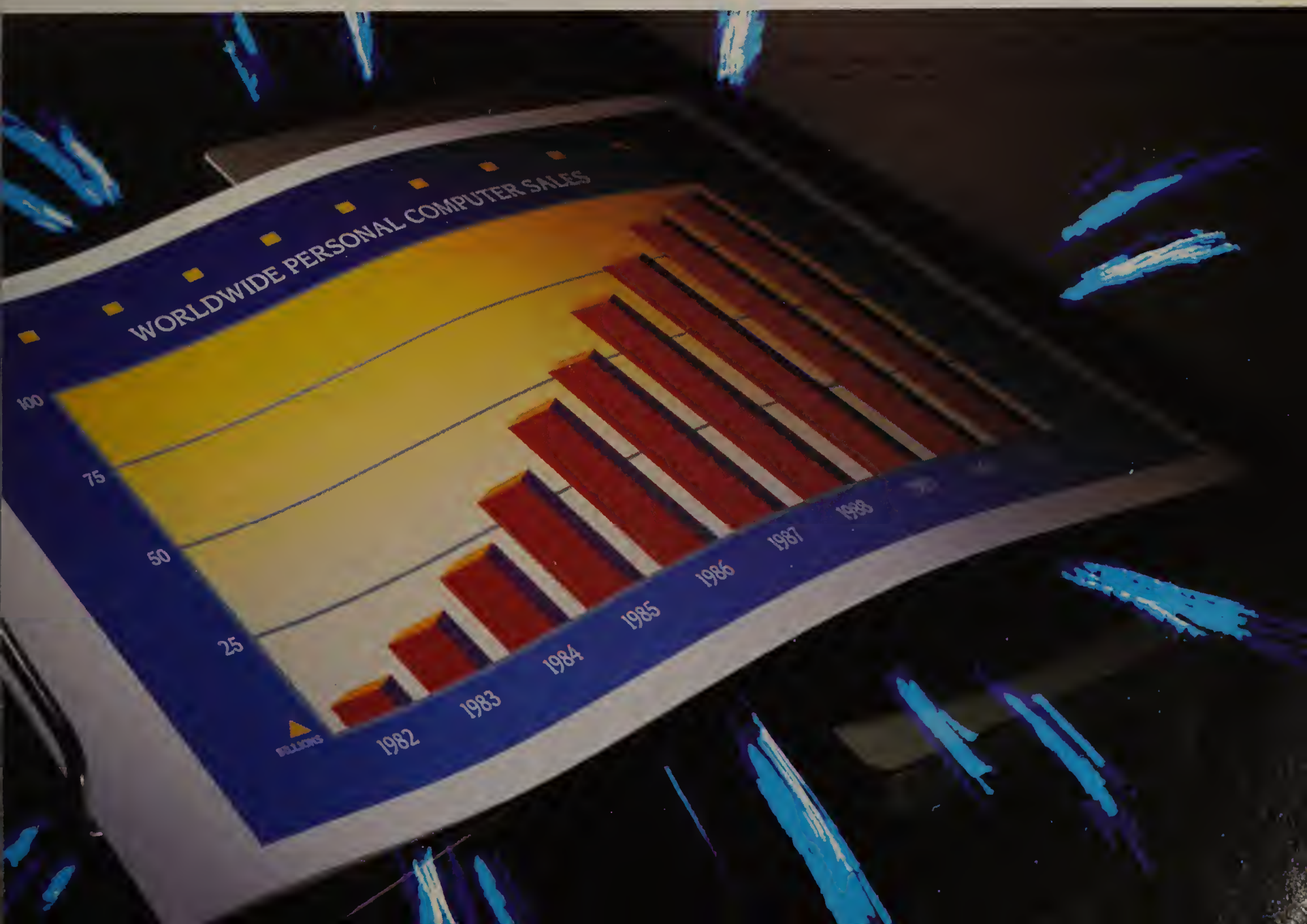
riety of notification options. 1MB min. memory. 5-user pack \$549; 25-user pack \$1995. Pacer Software, 619/454-0565; fax 619/454-6267.

PowerPrint

A QuickDraw printer driver package that includes software drivers and a serial-to-parallel-port cable that enable the Mac to print to more than 850 different types of printers, including models by Canon, NEC, Hewlett-Packard, and Epson. Software options allow for custom paper sizes, two-sided printing, reducing and enlarging images, and producing cover pages. 1MB min. memory. \$149. GDT Softworks, 604/291-9121; fax 604/291-9689.

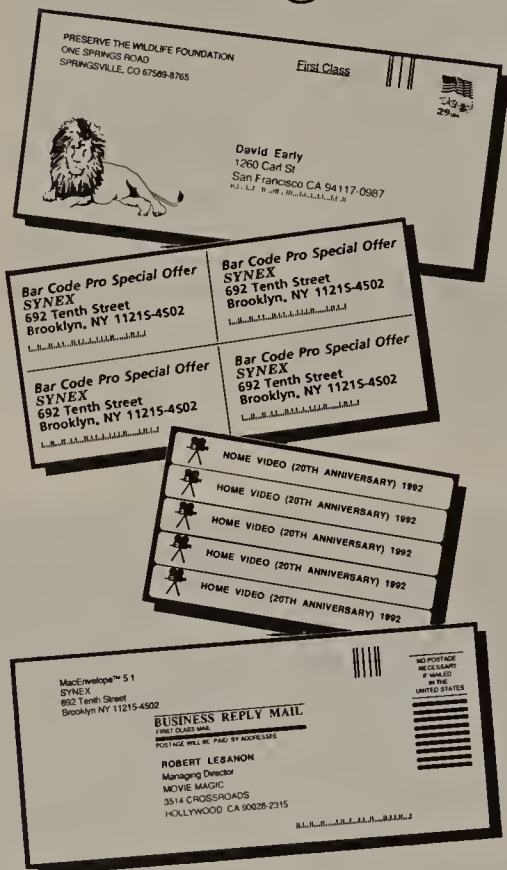
PrintMatch

A family of Photoshop-compatible plug-in filters, each customized to calibrate colors for one desktop color digital printer. User applies a PrintMatch filter to a Photoshop image to calibrate the image to the printer's color space. *continues*



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Individual filters are available separately or in groups. Company is working with third-party vendors and printer manufacturers to supply filters for all popular color printers. 4MB min. memory. Under \$200. Savitar, 415/243-3030; fax 415/243-3080.

Programmer's Bag of Tricks

Programmer's six-section library that includes source code written in Think C and interface files for MPW and Think Pascal. Sections include Listboxes, Modem and Communications, Offscreen Drawing, and Scroll bars. Each section and its associated routines are documented and ready for use in programs. 2MB min. memory. \$134.50. Data-Pak Software, 206/573-9155; fax 206/573-9269.

Sequencer

A package of software tools designed to aid in DNA sequencing. The product's alignment algorithm detects overlapping ends and assembles them into a consensus sequence called a contig. Notes can be attached to each fragment, and changes to bases in each sequence are highlighted for easy identification. Sequences can be read back through the Mac's speaker, and the package gives multiple views of assembled data. 2MB min. memory. Noncommercial site license \$1200; commercial \$2000. Gene Codes, 313/769-7249.

The Whirlitzer of Wisdom

Virtual jukebox containing enigmatic bits of wisdom; includes sound and animation. Jukebox-like interface works like an electronic fortune cookie, displaying bits of information on the screen and opening pathways to further metaphysical adventures. Requires HyperCard 1.2 or later. 1MB min. memory. \$39.95. ZBS Foundation, 518/695-6406.

Workspace

A program that runs under MultiFinder and acts as a graphical user interface for organizing work, automating routine computer functions, and keeping track of time spent on projects. The application

creates a three-dimensional office space with a worktable where projects are opened and closed, a bookshelf with binders for storing and accessing other applications, portfolios to hold documents, and a calendar that tracks time expenditures. 2MB min. memory. \$149. Ark Interface, 206/654-4127; fax 206/654-4188.



Workspace

Xpress Tips

HyperCard-based application designed to run alongside a QuarkXPress document under MultiFinder and offer tips and hints for QuarkXPress. Tips cover topics like how to easily create style sheets and how to increase the application's speed. 2MB min. memory. \$19.95. Dan Graphics, 612/870-4596; fax 612/870-4596.

CD ROMS

The Orchestra

An interactive guide to the orchestra—based on the *The Young Person's Guide to the Orchestra*, by Benjamin Britten—that offers lessons in conducting; exercises in the "Orchestration Lab," where compositions are put together; arcade games, such as Name That Instrument and Music Trivia; and a time line that teaches music history. In one mode the instrument that is playing appears on screen, and users can click to learn more about how that instrument is played. The sound track is recorded in digital stereo and can be played on any CD player. 2MB min. memory. \$79.98. Warner New Media, 818/955-9999; fax 818/955-6499.

Sky: Volume One

A collection of 100 color photographs of the sky; comes with a four-color catalog of printouts and includes unlimited reproduction rights. The images were scanned on a drum scanner from 35mm film at 2000 dpi. The CD uses a customized



Sky: Volume One

version of Radius's Impress-It 1.1 to decompress files. 1MB min. memory. \$129.95. CD Folios, 818/887-2003, 800/688-3686; fax 818/887-6950.

Soundtrak

Database and library of 150 original songs in MIDI format that can be played back on MIDI equipment or previewed in 8-bit digital audio. Songs can be searched and cataloged by description or style using the included software, and exported as MIDI files or to programs such as HyperCard. User can mix audio with a 16-channel mixer window that includes automated fade-in and fade out. 1MB min. memory. \$395.95. Opcode Systems, 415/369-8131; fax 415/369-1747.

Talking Classic Tales CD

A collection of five fairy tales on CD that are fully narrated in a digitized human voice and are accompanied by color illustrations. Users can click on difficult words, which are highlighted, to hear a definition read aloud; clicking on action buttons causes animated sequences to play. The stories in the collection are: *The Frog Prince*, *Rumpelstiltsken*, *The Elves and the Shoemaker*, *The Queen Bee*, and *Puss in Boots*. 2MB min. memory. \$99. Compton's NewMedia, 619/793-4817, 800/532-3766; fax 619/793-4813.

The Virtual Portfolio

A multimedia showcase compiled to help corporate buyers find artists, designers, writers, and musicians for the creation of projects ranging from ad copy to interactive multimedia presentations. The CD contains over 400MB of samples of graphics, sounds, and animation from more than 250 artists. Entries are cross-referenced and indexed visually and by medium used. Artists pay a per-megabyte fee for

inclusion, and the CD is distributed free to qualified corporate art and presentation departments. 5MB min. memory. \$99. One World Interactives, 503/683-4020; fax 503/683-3157.

ACCESSORIES

DiskGrafx

Custom disk imprinting service that prints images, logos, and text directly onto disk exteriors. Minimum order is 500 disks, and cost includes design and art production services. Pricing varies based on quantity. Lampro Graphics, 708/369-1251, 800/332-2240; fax 708/369-1989.



DiskGrafx

Mouse Grip

A product made of thermoplastic elastomer that adheres to the top and sides of a standard Mac ADB mouse to provide better grip and a larger area for the user to grab. Available in blue and neon green. \$10.95. Surface Concepts, 408/265-7236, 800/453-4747; fax 408/265-7236.

Parosingle

System for transferring computer graphics to fabric surfaces, such as cotton T-shirts or canvas. Requires a Mac connected to a color laser copier via a Canon IPU or an EFI Fierey CLC Controller. Paper also works with color copiers that are not con-



Parosingle

nected to a Mac. Images are printed on the paper and then are transferred to fabric using a heat press. 100 sheets \$150. Graffoto, 604/683-1232, 800/888-7838; fax 604/683-1235.

SentinelEve

Hardware and software package enables developers to provide a software

protection scheme for an application. Hardware key plugs into the ADB port; the software portion sends a message to the protected application, telling it not to operate if the key is not present. The hardware key has seven general-purpose, 16-bit registers with programmable memory to aid in building a custom security plan. Evaluation kits for developers \$39. Rainbow Technologies, 714/454-2100, 800/852-8569; fax 714/454-8557.



SentinelEve

TouchWindow

A touch-sensitive screen that fits over any monitor and allows user to pull down menus, make selections, move objects, and draw on-screen by touching the screen with a finger. The product is compatible with all Macs except the Portable and connects through an ADB port. \$335. Edmark Corp., 206/861-8200, 800/426-0856; fax 206/861-8998.

VariTask Workcenter

Computer workstations, available in six models, that have a double pedestal base, allowing independent height and tilt



VariTask Workcenter

adjustments on both front and rear work surfaces, and a 250-pound lifting capacity. Units also have monitor brackets for securing monitors and two electrical outlets. \$2500 to \$3600, depending on configuration. Mayline Hamilton, 414/457-5537, 800/822-8037; fax 414/457-7388.

BOOKS & VIDEOS

The Electric Cookbook

A binder containing step-by-step "recipes" for

graphic artists; the binder is divided into two sections: a set of hand-drawn thumbnails of typical print designs, and a collection of one-page support documents. The thumbnail section provides maps that indicate which support document should be used for a particular design, and each page discusses and demonstrates a particular computer workstation task. Quarterly updates include additional support pages and additional thumbnails. Annual subscription \$395. Lanman Systems Group, 813/287-0662, 800/683-0835; fax 813/287-0948.

Personal Training for Lotus 1-2-3

Audiotape-based training series for Lotus 1-2-3 on the Mac with three modules: Beginning Spreadsheets, Intermediate Spreadsheets, and Business Graphs. The training series teaches users to create and use spreadsheets; to format and present information; to solve "what-if" problems; and to share data between applications. \$99.95. Personal Training Systems, 408/286-1635; fax 408/977-1166.

Principles of Software Engineering

A training package that consists of 14 videotapes and provides an overview of current practices in software engineering. The course takes 11 hours to complete; student notebooks, supplemental training aids, and on-site teacher training from the author are also available. \$6000. Technology Media, 719/687-1889; fax 719/687-6041. **m**

To have your product considered for inclusion in *New Products*, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number to New Products Editor, *Macworld*, 501 Second St., San Francisco, CA 94107. *Macworld* reserves the right to edit all product announcements.

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Because StatView combines powerful statistics with a remarkably easy-to-use interface. And StatView is the only statistics package with fully-integrated presentation graphing, enabling you to analyze data and present your results all in one program.

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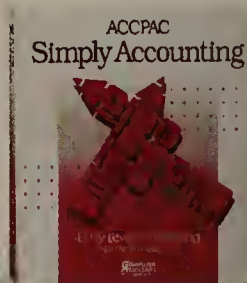
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Questions and Tips from Macworld Readers

BY LON POOLE

IF YOU INSTALLED THE WILD MAGIC control panel along with Apple's new QuickTime software, you may have discovered that After Dark (Berkeley Systems, 510/540-5536) no longer displays your favorite screen-saver module. Wild Magic works with System 7 to retrofit the copying, pasting, and playing of QuickTime movies to most word processors, spreadsheets, and other applications that can display PICT graphics but lack built-in QuickTime capabilities. An old version, Wild Magic 2.0b8, conflicts with the After Dark control panel unless you force Wild Magic to load before After Dark at start-up time, as described in last month's sage tip about such problems, "Conflict Resolution." For example, you could prefix After Dark's name with a tilde (~), as suggested by Matthew Bender of Poseyville, Indiana. Better yet, you can get Wild Magic 2.0 or later from a user group such as BCS Mac (617/625-7080) or BMUG (510/549-2684); Wild Magic is also available from online information services such as America Online. (Although QuickTime works with System 6.0.7, Wild Magic requires System 7.)

Excel Mix-Up

Last February I said that Excel 3.0's Page.Setup macro command could set the Page Orientation option to Landscape, and it can—in the Windows version of Excel. Moreover, the Windows version can set the paper size or scaling factor but the Mac version cannot. Ole A. Kongsgaarden of Kristiansand, Norway, read the Excel Function Reference manual very carefully and spotted a paragraph that states these limitations in the Mac version. On the Mac, the Page.Setup macro command can set only the options that Microsoft has added to Apple's standard Page Setup menu command—header, footer, margins, center horizontally, center vertically, print row and column headings, and print guidelines. Having virtually identical versions of Excel for the Mac and for Windows may simplify file exchange between the two, but surely complicates the manuals.

Fax-OCR Mystery

In December 1991 I said OmniPage, optical character recognition (OCR) software from Caere (408/395-7000 or 800/535-7226), can convert the text from a fax modem's graphic image to text you can edit. JoJo Mastrianni of Schenectady, New York, couldn't get OmniPage 2.0 (an old version) to open fax image files. According to Caere, most fax modems save fax image files in Type 3 or Type 4 TIFF graphics formats (both also known as CCITT TIFF), which even OmniPage 3.0 purportedly can't open. Inexplicably, OmniPage 3.0 opened and converted my sample fax files from two hard drives and an AppleShare file server but, I later discovered by accident, not from four other drives. Caere's flagship OCR software, OmniPage Professional 2.0, can open and convert black-and-white (also called line-art) TIFF formats 1 through 4, making it compatible with most receive-fax modems. It worked with my sample fax files (received and saved by Global Village's TelePort/FullFax) on all the hard drives I tried it with. An upgrade from any version of OmniPage to OmniPage Professional 2.0 costs \$150.

Better Centesimals

The formula in last October's *Quick Tips* for averaging times that include centesimals (hundredths of a second) did not correctly calculate the average centesimals. It ignored all but the centesimals themselves in that calculation, whereas the other values (hours, minutes, and seconds) can all have an effect on the average centesimals. For instance, if there were seven times that summed to exactly 1 hour, the original formula would give an average time of 8:34.00, but the correct average is 8:34.29.

The original formula was based on a spreadsheet with the columns in cells B2:D9 representing hours, minutes, and seconds, and totals of each column in cells B10:D10. Using

the same cells, Tyler Abbot of San Francisco suggests calculating the total number of seconds with the following formula in cell D11:

= (B10 * 3600 + C10 * 60 + D10) / ROWS(B2:D9)

To display the average, use this formula:

=TEXT(TIME(0,0,D11),"h:mm:ss")&TEXT(D11 TRUNC(D11),".00")

Missing Control Panel

Q. While trying to install a screen-saver DA using Font/DA Mover on my Mac LC, I mistakenly removed the Control Panel desk accessory. I couldn't find it in the Trash or in the System Folder. I used the Finder, MacTools, and everything else I could think of, without success. Where did my Control Panel go and how do I get it back?

Louise Pettus
Rock Hill, South Carolina

A. Since you're using Font/DA Mover and were able to remove the Control Panel with it, you must be using System 6. (With System 7 you don't need Font/DA Mover, and the Control

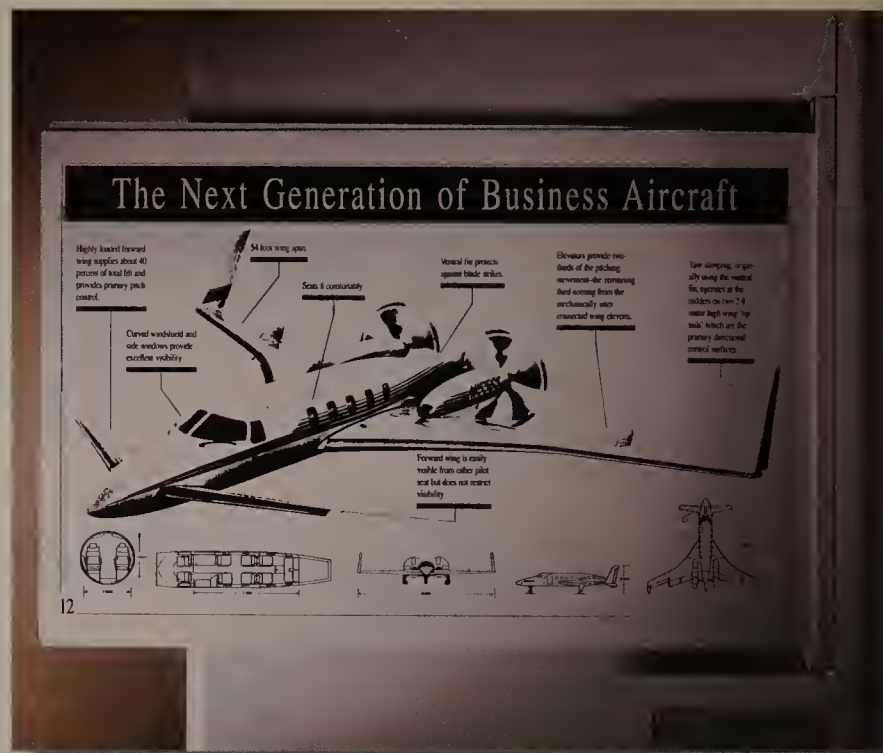
Panel is a folder inside the System Folder. You install desk accessories in System 7's Apple menu by dragging them to the System Folder icon, or you can open them directly by double-clicking them.)

When Font/DA Mover removes a desk accessory or a font, that item is gone. You can't undo the removal and you can't recover a removed font or desk accessory with a disk utility program like MacTools. To get the Control Panel back, use Font/DA Mover to copy it from a backup of the System file or from the System file on your original system software floppy disks. Be careful to lock the disk before inserting it so you can't accidentally remove anything from it. If you need

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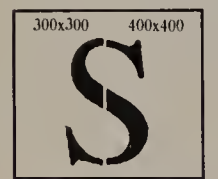
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replacement system software disks, ask a friend, a coworker, a local dealer, or a Macintosh user group (call 800/538-9696 to locate a user group).

Multiple-Monitor Configuration

Q. My Macintosh IIfx has two monitors, a 14-inch color and a 2-page gray-scale display. I made the gray-scale monitor the main monitor by dragging the miniature menu bar in the Monitors section of the Control Panel, but the start-up screen and INIT icons still appear on the color monitor. How can I move them to the gray-scale monitor? Swapping video boards in the NuBus slots did not work.

Michael T. Fussell
Missoula, Montana

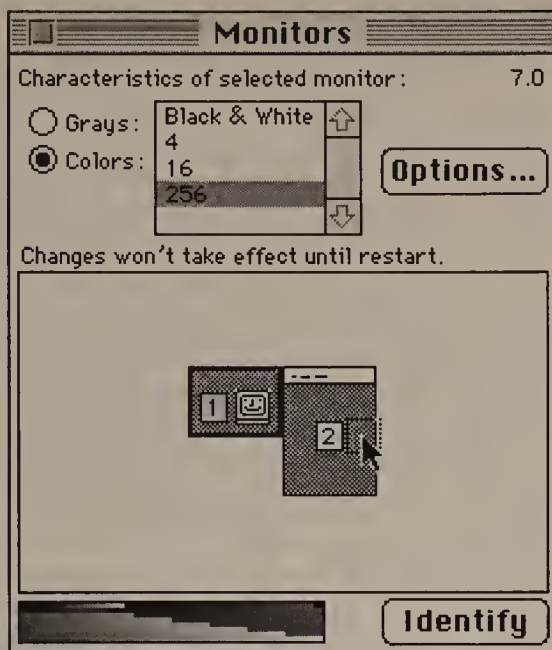
A. Two monitors aren't just for Mac II systems. For example, an SE or SE/30 can have a large-screen monitor connected to its expansion slot and still use the built-in monitor. A Plus or Classic can have a similar arrangement even though neither one has an expansion slot. You can use the Monitors section of the Control Panel (the Monitors control panel in System 7) to change the monitor used at start-up time (see "Monitors Option"). If you also drag the monitors in the Control Panel to rearrange them, you may have trouble aligning them so that you can slide the pointer smoothly across the top (or the bottom) from one monitor to the other. Pressing one of the arrow keys nudges the selected monitor in the control panel, helping you precisely align the monitors. To quickly check alignment, close Monitors and open it again. If the monitors aren't lined up perfectly, adjust them and check again. Sometimes it helps to press the shift key and drag all the monitors as a group to a different spot in the Control Panel.

Confused Ruler

Q. I alternate between two Macs with 9-inch monitors and have noticed that Microsoft Word's ruler shows 6.7 inches on one Mac and only 6 inches on the other. How do I change the 6-inch ruler to fit 6.7 inches across the screen?

Andrew I. Sue-A-Quan
Don Mills, Ontario, Canada

A. Most word processors adjust their formatting rulers according to the resolution (dot density) of the printer last selected with the Chooser desk accessory. You may have noticed that when you close the Chooser after you change printers, the Chooser tells you to choose Page Setup and click OK in all your open ap-



Monitors Option If your Mac has multiple monitors, you can use the Monitors control panel (in System 7) to designate any one as the start-up monitor. Pressing the option key marks the current start-up monitor with a tiny smiling-Mac icon in the control panel. Drag the tiny icon to the monitor you want to use during start-up and restart the Mac.

plications. Doing that resets the ruler to match the newly selected printer. You get a 6.7-inch ruler with a LaserWriter, StyleWriter, or Personal LaserWriter LS. With an ImageWriter, you get a 6.7-inch ruler if the Page Setup command's Tall Adjusted option is on, but you get a 6-inch ruler if that option is off. You can select any type of printer listed in the Chooser whether the Mac is connected to one of those printers or not. For example, you might select LaserWriter in the Chooser on your ImageWriter-equipped Macintosh at home or your Mac PowerBook in flight so the documents you create would be ready to print later on a LaserWriter at work. To add another type of printer to the Chooser's list, simply copy the printer driver file that has that printer's name and icon to the System Folder.

Big Desktop Patterns

TIP With ResEdit 2.1 or later you can modify System 7 to decorate your desktop with a custom pattern of up to 64 by 64 pixels. (The standard desktop patterns you select with the General control panel are 8 by 8 pixels.) Unfortunately, designing 64-by-64-pixel patterns can be quite tedious. The Terraform module of Berkeley Systems' More After Dark [which requires After Dark 2.0—L.P.] can create beautiful patterns that repeat perfectly on the desktop. Here's how:

1. In After Dark, select the Terraform module and set the Repeat Size option to 64. Activate After Dark by moving the pointer to the sleep corner or by click-

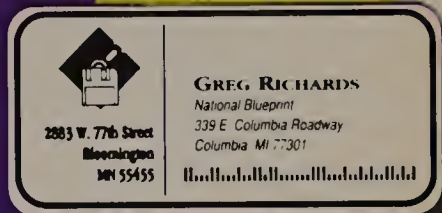
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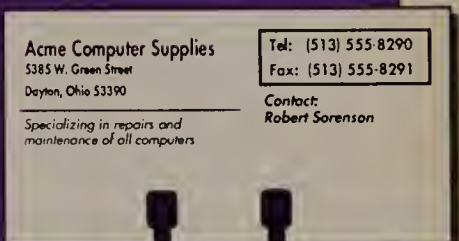
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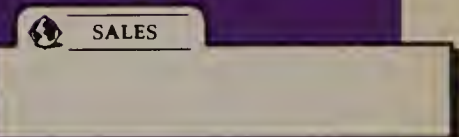
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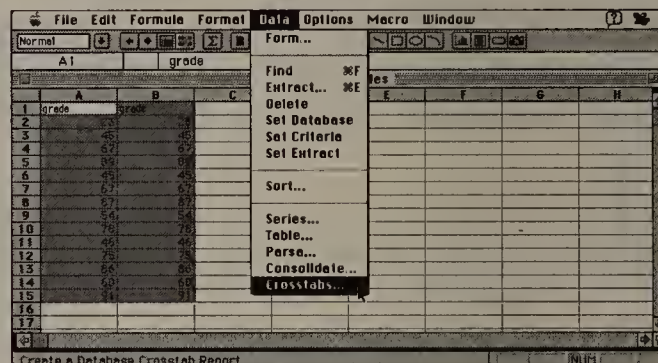
*Lotus 1-2-3 spreadsheet; call for details. © Orange Micro Inc., 1992

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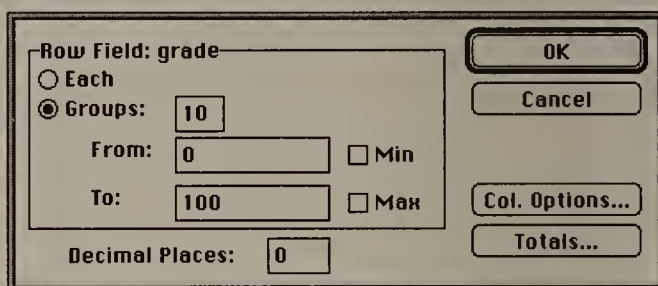
Frequency Distribution

A university instructor who teaches large classes, Larry MacPhee of Irvine, California, likes to examine a frequency distribution of his students' test scores before he signs them letter grades. Creating histograms that graphically depict data distributions should be easy, but Microsoft Excel offers this function only as a library macro with less-than-clear instructions. After much trial and error, MacPhee figured out the correct procedure and recorded it using Apple's MacroMaker system extension so he could forget all the convolutions. He had better luck with MacroMaker than with Excel's built-in macro recorder. (MacroMaker doesn't work reliably with System 7, but you could use CE Software's QuicKeys 2.1.1 instead.) Here are the steps for Excel 3.0.

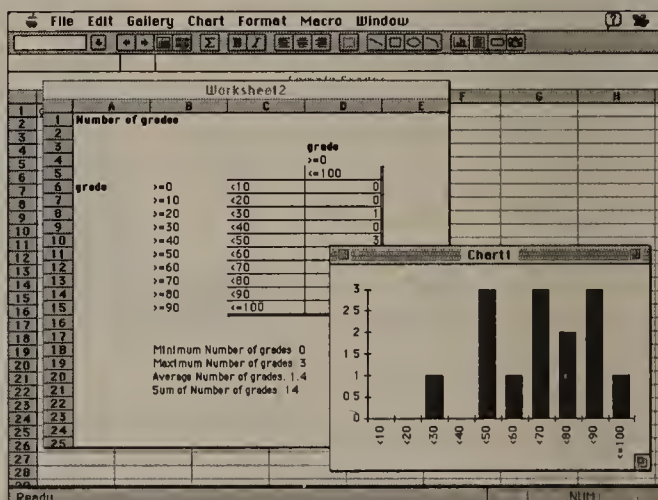
1. Enter student grades in a column with a label such as Grades at the top of the column (in this example, column A). Copy that column into the adjacent column (in this example, column B). You have to copy the data because Excel's Crosstabs macro requires at least two columns of data to generate a distribution. Next select the block of cells containing data and labels (A1:B15 here) and choose Set Database from the Data menu. Open the Crosstabs file, which is located in the Macro Library folder in the Excel folder. If you want to automate the procedure, start recording with MacroMaker or QuicKeys now. Then run the Crosstabs macro by choosing Crosstabs from the Data menu.

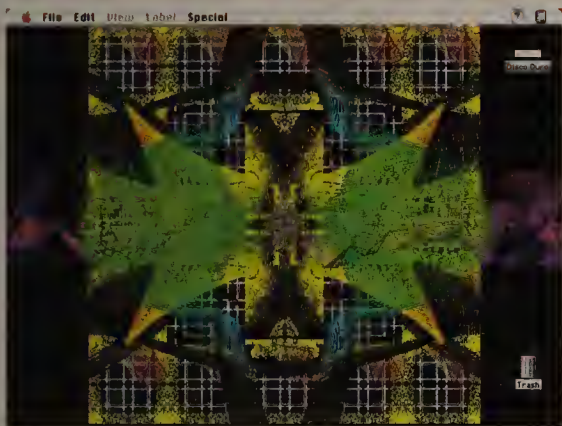
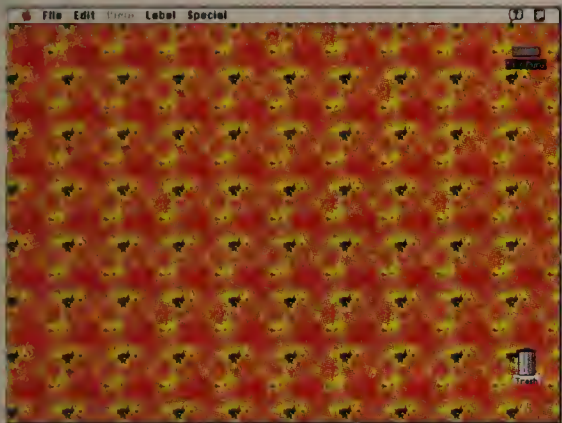


2. In the Crosstabs dialog box that appears, click the Row Options button, and another dialog box appears. In it change the Row Field option to Groups and enter 10 in the Groups box to set the number of intervals in the distribution. To set the distribution range manually, you must turn off the Min and Max options. Enter 0 in the From box and 100 in the To box, and then click the Col. Options button. Do everything the same way in the Col. Options dialog box, except enter 1 in the Groups box instead of 10. Click OK to return to the main Crosstabs dialog box and click OK there to run the Crosstabs macro.



3. A new worksheet appears reporting the frequency distribution in intervals. Stop recording in MacroMaker or QuicKeys and save your recording so that next time you can let the machine set the intervals and ranges automatically. Finally, select the data in the worksheet table and create a new bar chart of the distribution based on the data.





Fancy Desktops You can use ResEdit to replace System 7's standard gray 8-by-8-pixel desktop pattern with a big, colorful 64-by-64 pattern made by More After Dark's Terraform module (top). Or replace patterns with a picture (bottom) by installing DeskPic or DeskPicture software in your System 6 or System 7 System Folder. (This picture was created by Macworld associate editor Cathy Abes using an After Dark MultiModule.)

ing the Demo button. Wait until you see a pattern you like and then press ⌘-shift-3 to have System 7 capture the screen in a PICT file at the root level of your start-up disk (not in a folder). You can experiment with colors and textures by clicking the Terraform module's Terrain button and trying different settings in the dialog box that appears.

2. Open the screen capture, named Picture 1, with a program that enables you to select a 64-by-64-pixel piece. I use GIFConverter 2.2.8, which shows the size of the selection as you use the marquee tool (selection rectangle). Select the 64-by-64 area that you want to become your desktop pattern, and copy it to the Clipboard (with the Edit menu's Copy command).

3. Copy the System file with the Finder—for example, press option while dragging the System file from the System Folder to the start-up disk icon—and then open the copy with ResEdit 2.1 or later. In ResEdit, scroll until you see the icon for the resource named ppat (pixel pattern) and double-click it to open it. There should be one resource numbered 16; open it by double-clicking. A pattern-editing window appears along with three new menus—Transform, Color, and ppat. Choose Pattern Size from the ppat menu

and set the pattern size to 64 by 64, making the pattern-editing window larger. Paste the pattern from the Clipboard to replace the standard gray pattern. Quit ResEdit, answering yes when it asks whether you want to save changes to the System file.

4. Drag the unedited System file out of the System Folder, drag the edited System file into that folder, and restart. When the Finder's menu bar appears, you should be rewarded with a very pleasing desktop pattern.

*James Crawford
Baltimore, Maryland*

ResEdit, Apple's resource editor for manipulating icons, patterns, and much more, is available from user groups and online information services. So is GIFConverter, a shareware program by Kevin A. Mitchell for viewing and converting the format of graphics files. Many commercial graphics programs also show the selection size, including Canvas 3.01, PixelPaint Pro, Studio/8 1.0, and SuperPaint 3.0. To take desktop patterns to the next step—multiple patterns in sizes up to 128 by 128—you can get the Wallpaper control panel (Thought I Could, 212/673-9724). It works with System 6.0.5 and later, as well as System 7, on any color-capable Macintosh (including the Classic II and the SE/30) and includes pattern-editing tools. Instead of a desktop pattern, you can display a desktop picture (see "Fancy Desktops") by installing the DeskPic system extension (available from user groups and online information services) or the DeskPicture control panel (part of Now Software's Now Utilities, 503/274-2800).—L.P.

Label-Alignment Check

TIP To check the position of laser-printed mailing labels without wasting sheets of labels, make a template by removing every other label from one sheet, leaving a checkerboard pattern of spaces where the translucent backing paper shows through. Print test labels on plain paper and lay the template over it to check alignment.

*Alan M. Winslow
Pleasanton, California*

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LON POOLE answers readers' questions and selects their tips for this monthly column. His two most recent books are *Amazing Mac Facts* (Microsoft Press, 1991), a collection of the best published tips; and *Macworld Guide to System 7* (IDG Books Worldwide, 1991).

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Customizing Word Processors

BY JIM HEID

A WORD PROCESSING PROGRAM lets you concentrate on writing instead of mechanics. Go ahead and type—there's no fussing with paper, no pressing the return key at the end of every line, no painting with correction fluid. A variety of fonts, type sizes, and styles are a menu away. Advanced formatting is relatively easy, too. An on-screen ruler lets you change margins and create indents and tab stops. You can automatically number pages and create *headers* and *footers* that appear at the top and bottom of every page.

If you used to write with a typewriter or if you use a word processor only occasionally, you might be so taken with these basic word processing features that you haven't bothered to explore the more-sophisticated labor-saving features your program provides. But you should. Whether you write a memo once a week or a chapter every day, you can save time by customizing your word processor.

I examine several customizing techniques in this month's column; after each tip, I describe how to apply the technique to the Macintosh world's most popular and powerful word processors: Microsoft Word 5.0 and WordPerfect for the Macintosh 2.1. For tips on applying this information to programs such as T/Maker's WriteNow, Claris's MacWrite II and ClarisWorks, and Microsoft Works, see "Customizing Other Programs."

Create a Personal Dictionary

THOUGH A WORD PROCESSOR'S SPELLING checker can't guarantee perfect spelling, it can help. But what if you use words that aren't in the program's dictionary? Names, scientific jargon, abbreviations, and slang can confound a spelling checker. And as you hurry to complete a document, it's tempting to click on the spelling checker's Ignore or Skip button to bypass terms you know are spelled correctly.

But wait—instead of telling your program to ignore those terms, add them to your *user dictionary*. Sometimes called a *custom dictionary*, this is a separate file that supplements the program's built-in dictionary. Adding terms to a user dictionary essentially expands your word processor's

vocabulary. The spelling checker runs faster, you don't have to click on Ignore all the time, and your documents are that much more accurate.

How to: Word Click on the Add button in the Spelling dialog box. Microsoft Word 5 can work with numerous custom dictionaries at once; consider creating separate dictionaries for different types of terms—legal terms, names, and so on. Use the Spelling option in the Preferences dialog box to switch among and edit custom dictionaries (see "Editing Dictionaries"). To add a word to a specific custom dictionary, select the dictionary's name from the Add Word To pop-up menu before clicking on Add.

To add a word to a custom dictionary in Word 4, select the dictionary's name and then click on the plus sign (+) button in the Spelling dialog box. Better yet, upgrade to Word 5; its spelling checker is greatly improved.

How to: WordPerfect Click on the Add button in the Speller dialog box. To edit the user dictionary, use the ST Utility program that comes with WordPerfect 2.1. To edit the user dictionary in WordPerfect 2.0, choose Open, select the All option from the Show pop-up menu, and then double-click on the file named USA-User Dictionary.

Word and WordPerfect also let you customize other aspects of their spelling checkers. You can use the Spelling option in the Preferences dialog box to tell Word to ignore words in all capitals as well as words containing numbers (such as 100K). You can use the Check menu in WordPerfect's Speller dialog box to tell the program to watch for duplicate words (such as *and and*) and ignore words containing numbers.

If you work in the legal or medical profession or with languages other than English, you might consider buying a specialized spelling checker dictionary. For Word 5, Alki Software Corporation's Comprehensive Proofing Tools series includes a custom dictionary containing 74,100 medical, legal, and business

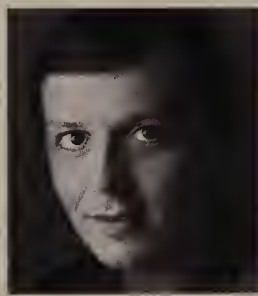
terms. Alki Software also sells the dictionaries Microsoft ships in countries other than the United States. WordPerfect Corporation sells a variety of dictionaries.

Create Stationery

IF YOU ALWAYS CREATE SIMILAR TYPES of documents—memos, letters, fax cover sheets, contracts—create *stationery* for them. A stationery document is electronically preprinted with whatever text, graphics, and formatting information you use in a certain kind of document—just as a piece of company stationery is preprinted with a name and address. Stationery for a letter might contain your return address. Stationery for a newsletter might contain the publication name, placeholder text for the headlines and table of contents, and formatting settings for multi-column pages.

Using a stationery document is easy: you just open it and start writing. Couldn't you simply open an old newsletter or memo and replace its contents? Yes, but you might accidentally choose Save instead of Save As, thereby losing the old document. By contrast, your word processor will open an untitled copy of the stationery document so you can't accidentally change the original.

How to: Word and WordPerfect Create the text and graphics and/or specify the desired margin and formatting settings, and then choose Save As from the File menu. In Word, choose the Stationery option from the Save File As Type pop-up menu. In WordPerfect, choose WordPerfect Stationery from the Format pop-up menu. Type a name and then click on Save.



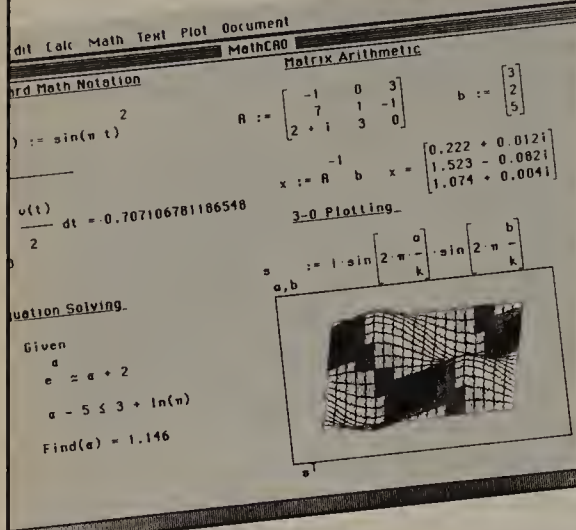
*How to
save time and
keystrokes
by customizing
your
word processor*

Cut Keystrokes with Glossaries

CHANCES ARE YOU FREQUENTLY use certain terms or sections of text—a return address, a closing for a letter, scientific terms, contract clauses. Instead of typing them over and over again, store them as entries in a Word *glossary* file. A glossary entry can contain any amount of text, from a

continues

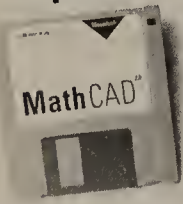
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single character to an entire document, including graphics. You can insert a glossary entry into text with a few keystrokes. A single glossary file can contain as many entries as will fit on disk. You can also create any number of glossary files and switch between them. You might create separate glossaries for separate jobs—one for letters, one for contracts, one for technical manuals.

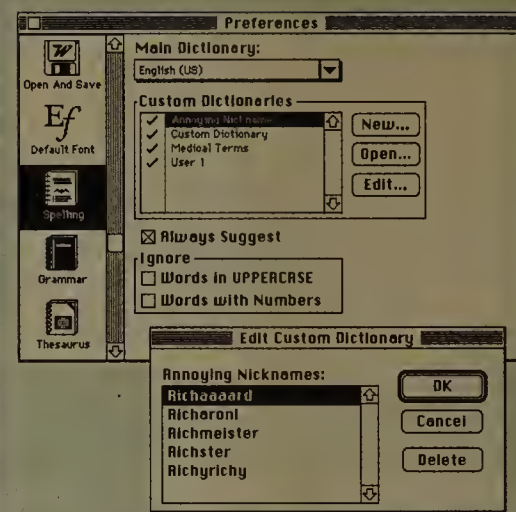
How to: Word Type the text to be stored, then select it and choose Glossary from the Edit menu. In the Glossary dialog box, type a short name for the entry and then click on Define. To insert a glossary entry in your document, press ⌘-delete, type the entry's name, and then press return. (Or, choose the Glossary command, select the entry, and then click on Insert.) To add a glossary entry to the Work menu, choose Glossary, press ⌘-option-equal sign, and then click on the entry's name. To save or open a glossary file, choose Save or Open from the Glossary dialog box. See page 249 of the *Word 5 User's Guide* for more details. (These functions work in Word 4.0 also.)

How to: WordPerfect WordPerfect lacks a glossary feature, but you can obtain the same keystroke-saving benefits by creating a *macro*—a series of keystrokes and/or menu choices that you record and save for later playback.

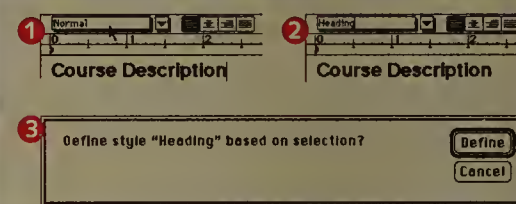
Automate Formatting with Styles

IF YOU FREQUENTLY SWITCH BETWEEN text formats within a document, you ought to be using *styles*. (A style is a set of text formats—font, size, type style, line spacing, and so on—that you can apply in one fell swoop; a style sheet is a collection of styles for a given document.) For example, say you always format reports to have double-spaced 14-point Helvetica Bold headings and single-spaced 10-point Times body text. If you define styles for the headings and body text, you can format these elements with a single mouse click or keystroke—no traveling from menu to menu and threading through dialog boxes. Besides saving time, styles help ensure consistent formatting. This can be especially valuable for projects involving numerous writers: you can create a stationery document containing the styles used in a project, and then give each writer a copy.

Styles have additional advantages. If you change a style's description—perhaps switching from 10-point Times body text to 12-point Palatino—your program will reformat all text formatted under that style. This lets you experiment with different formatting options without a lot of manual reformatting. Another plus: Word and WordPerfect styles are supported by



Editing Dictionaries In Word 5.0, you can switch between custom dictionaries using the Spelling option in the Preferences dialog box (top). Check marks indicate open dictionaries. Tip: When adding a large number of words to a dictionary, uncheck the Always Suggest option; that way, Word won't waste time looking up alternative spellings. Selecting a dictionary and then clicking on Edit displays the dialog box, where you can remove words (bottom).



Formatting with Style To create a style in Word, format some text and then click within the ruler's Style pop-up (1). Type a name for the style (2), and click on Define (3). You can then apply the style to a different paragraph by selecting the paragraph and choosing the style from the ruler's pop-up.

publishing programs such as Aldus PageMaker and QuarkXPress. You can import a Word or WordPerfect document into either of these programs and retain the original style definitions and formatting.

How to: Word Format some text as desired. Display the ruler (choose Ruler from the View menu). With the blinking insertion point within the text, click once within the ruler's style pop-up menu (see "Formatting with Style"). Type a name for the style and then press return. When Word asks if you want to define the style based on the selection, click on Define. To apply the style to another paragraph, place the insertion point within the paragraph and then choose the style's name from the ruler's pop-up.

How to: WordPerfect Format some text as desired. With the insertion point within the text, choose New from the Layout menu's Styles submenu. Type a name for the style and then click on New. To apply the style to another paragraph, place the insertion point within the paragraph and then choose the style's name from the Styles submenu.

Work

Fax Cover Sheet
Memo Stationery
Table of Contents

Documents

date long ^D
standard waiver ^S

Glossary entries

Drop Cap
Normal

Styles

Insert Columns
Insert Rows
Delete Columns
Delete Rows

Table-editing
commands

^D

^S

^%U

^%H

Put Word to Work Word's Work menu can hold the names of items you use frequently. To add a keyboard shortcut to a Work menu command, press ⌘-option-plus sign using the plus sign on the numeric keypad. The pointer turns into a ⌘ symbol. Choose the command to which you want to add a shortcut, and then type the key combination you want to assign to that command. Consider using control-key sequences to avoid having to replace a built-in ⌘-key sequence. The control key is indicated in menus by the caret symbol (^).

Both Word and WordPerfect also let you link styles together so you can automatically switch from one style to the next when you press return (or, in WordPerfect, enter). For instance, if you link your heading style to the body text style, the program automatically switches to the body text style after you type a heading. Both programs also let you base one style on another. If, for example, you're creating two styles that use the same line-spacing settings but different fonts, you can base the second style on the first. If you want to change line-spacing settings later on, you need alter only the first style. For details on these options, see page 189 in the Word 5 *User's Guide*, and page 426 in the WordPerfect 2.1 *Reference*.

Tailoring Keyboard Shortcuts and Menus

LET'S LOOK AT SOME WAYS TO CUSTOMIZE your word processor itself, starting with its keyboard shortcuts and menus. Word lets you change its keyboard shortcuts and even reorganize commands within its menus. If you never use any of the footnoting and indexing commands, for example, you can remove them to tidy up your menus.

Better still, you can add commands that correspond to options within Word's dialog boxes. For example, Word's Table Layout command lets you change the arrangement of rows, columns, and cells in tables created with Word's table editor. But when you're performing major surgery on a table, choosing Table Layout over and over again gets old quickly. The solution: Add the Table Layout dialog

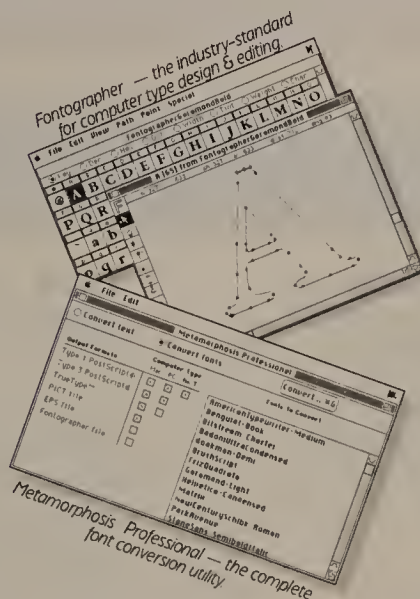
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box's options to Word's menus, where you can choose them directly.

Word provides a special menu, called **Work**, that can hold the names of often-used documents, styles, and glossary files. You can add keyboard shortcuts to menu commands, thus gaining one-key access to the files, styles, and glossaries you use most (see "Put Word to Work").

WordPerfect also lets you change and

create keyboard shortcuts for menus and the style sheets and macros you create. Unlike Word, WordPerfect also lets you reorganize the position of keyboard characters themselves. For example, if you use the trademark symbol (™) frequently, you might want to assign it to the option-T key sequence instead of its usual (and more easily forgotten) option-2 sequence.

How to: Word To remove a com-

mand from a menu, first press ⌘-option-hyphen. When the mouse pointer turns into a bold minus sign, simply choose the doomed command. To add a dialog box option to a menu, open the dialog box and then press ⌘-option-equal sign (the key to the left of the delete key). When the pointer turns into a bold plus sign, click on the desired dialog box option. (If the pointer remains a bold plus sign, the op-

Customizing Other Programs

You don't use Word or WordPerfect? Take heart. You can apply many customizing techniques to other programs.

Custom spelling checkers All popular word processors and integrated packages have spelling checkers and support custom dictionaries.

Stationery You can create stationery with ClarisWorks, T/Maker's WriteNow 3.0 (which should be out by the time you read this), and Claris's MacWrite II. It's worth noting that if you use System 7, you can turn a document created in any program into stationery. At the Finder, select the document and choose **Get Info** from the File menu, and then check the Stationery Pad box. Thereafter, when you open the stationery document, the Finder duplicates the stationery document and then opens the duplicate. Apple built this feature into System 7 to enable you to create stationery for programs that don't support stationery directly.

Glossaries Only Word has a glossary feature, but ClarisWorks and Microsoft Works have macro recorders that enable you to record and

play back key sequences. You can also save and insert repetitive text in any program using CE Software's QuicKeys² keyboard-enhancement utility.

Styles WriteNow 3.0 has excellent style features. MacWrite II's custom-styles features let you store and recall character formatting, but not paragraph-level formatting such as line spacing, margins, and indents. ClarisWorks and Microsoft Works lack style features, but you can simulate them by recording macros that choose formatting commands.

Menu and keyboard customizing You can use ClarisWorks or Microsoft Works macros to create your own keyboard shortcuts. Better yet, use QuicKeys² to create shortcuts for all your programs.

Macros With QuicKeys² you can add macro features to any program. QuicKeys² doesn't offer all the power and flexibility of a built-in macro feature, but it does let you record and play back repetitive tasks. And it lets you customize other aspects of your Mac.

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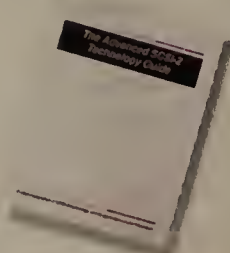
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* Chart measures sequential reads (350 blocks) using MacinMeter with a 2GB Fast SCSI-2 hard drive. 3.5 MB/sec. test was run on the Macintosh Quadra native SCSI port.



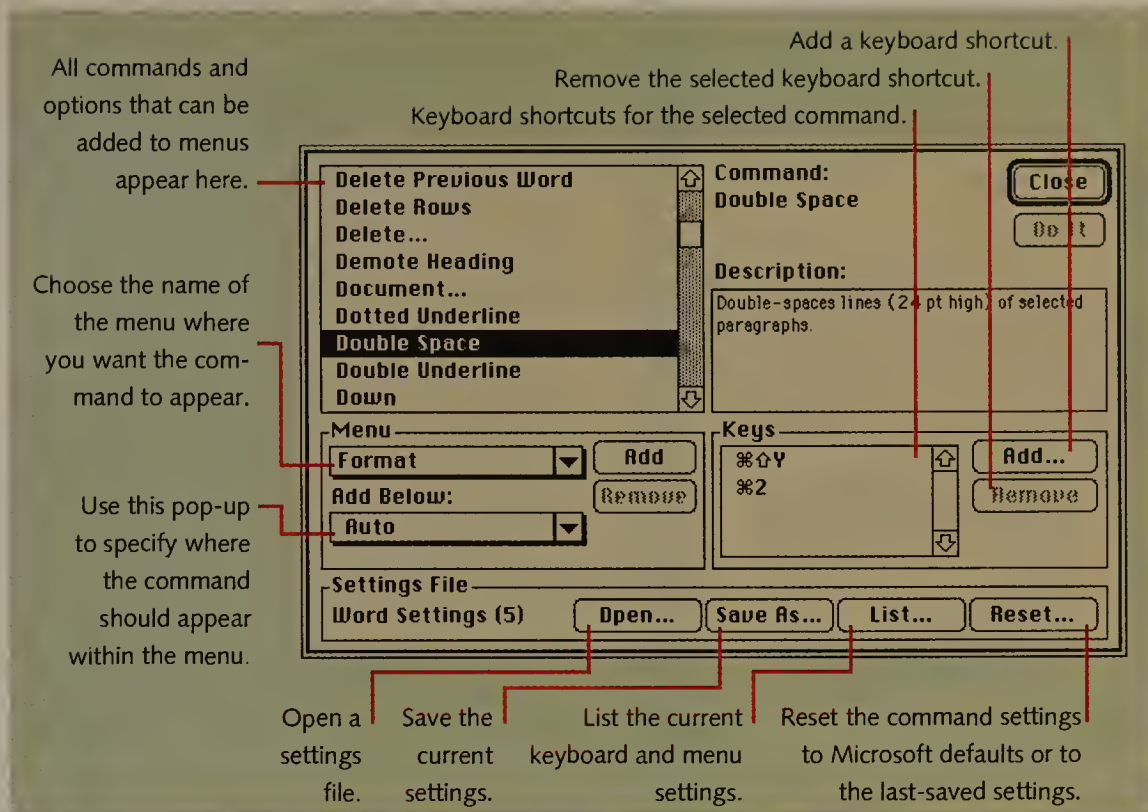
tion you clicked on lacks a corresponding command. To restore the normal pointer, press ⌘-period or the esc key.) You can also use the Commands dialog box to add or remove commands and to switch between *settings files*, which store command settings (see "Command Performance").

How to: WordPerfect Choose Keyboards from the Preferences submenu (File menu) to display the Keyboard Management dialog box. Use the Type pop-up menu to specify how you want to modify the keyboard; for example, choose Characters to change a keyboard character, Commands to assign or remove a keyboard shortcut, or Styles to assign a shortcut to a style. Then select a character, menu command, or style or macro name and use the Assign or Remove button to add or remove a keyboard shortcut (see "Modifying WordPerfect Keyboards").

WordPerfect keyboard settings are stored in a *keyboard template*. You can create as many keyboard templates as you like and switch between them using the Keyboard Management dialog box.

Macros: Writing on Autopilot

IF YOU FREQUENTLY PERFORM THE same sequence of steps, consider recording those steps in a macro for later playback. Macros can perform simple jobs,



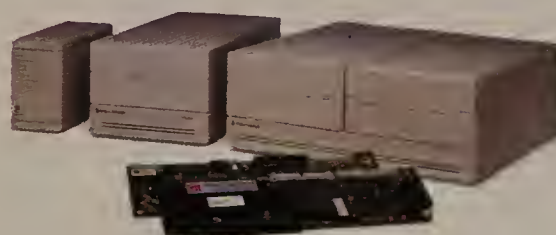
Command Performance Word's Commands dialog box is the gateway to modifying the program's menus to your own specifications.

such as inserting often-used text or automatically changing all double hyphens (--) to typesetter's em dashes (—). But a macro can also perform a sequence of events—opening a document, searching for and replacing some text, saving the document, and then printing it. You can

even create macros that display dialog boxes and then make decisions based on your response. For example, you could create a form letter whose contents vary depending on whether a client's account is paid up or past due.

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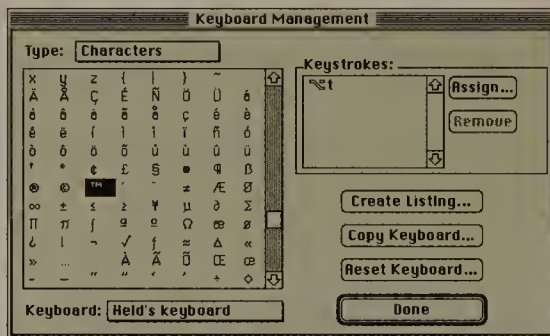
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Modifying WordPerfect Keyboards WordPerfect's Keyboard Management dialog box changes with the option you choose from the Type pop-up menu. Top: The Characters option lets you move characters to different positions on the keyboard; here, option-T is assigned to the trademark symbol. Bottom: The Commands option lets you assign shortcuts to menu commands. Here, option-F9 is assigned to the Center Current Page command.

How to: Word Word 5's macro language, called WordBASIC, is scheduled to be available by the middle of this year. Unlike the macro features in WordPerfect and most other programs, WordBASIC will not provide a record mode that watches over your shoulder and records your keystrokes and command choices; instead, you will have to create macros manually by typing commands into a window. But the language will be powerful; advanced users will be able to write macros that do such tasks as display dialog boxes prompting for information, link Word documents to Microsoft Excel spreadsheets, and much more.

How to: WordPerfect To record a macro, choose Record from the Macro menu. Type a name for the macro and then click on New. Next, perform the steps you want to record. If you need to scroll while recording, use the keyboard's scrolling keys, not the mouse. When you've finished recording, choose Stop Recording from the Macro menu. (You can also pause recording by choosing Pause from the Macro menu's Options submenu; choose Resume to continue recording.) When asked to save changes, click on Yes. Unless you say otherwise, WordPerfect stores macros in your *private library*; this file, located in the System Folder, can hold macros, styles, keyboard templates, and more. Items in the private library are available in any open document. If you want a macro (or a style, keyboard template, or other item) to be avail-

able only when a certain document is open, save it in that document.

Fine-Tuning Memory and Disk Requirements

FREE MEMORY AND DISK SPACE ARE often in short supply. If you're willing to forgo some speed and features, you can dramatically reduce your program's appetite for kilobytes.

To reduce any program's memory requirements, select its icon at the Finder and choose Get Info from the File menu. In the Get Info window, specify how much memory you want to give the program by typing the value in the Current Size box. (In system versions prior to 7.0, this box reads Application Memory Size.)

Reducing disk space requirements means doing without. Remove files corresponding to features that you don't use, remove sample or tutorial documents you don't need, and expunge any unneeded *converters*, which enable the program to swap documents with other programs.

How to: Word Word runs in as little as 512K of memory, although performance suffers and the grammar checker doesn't work. You may also encounter low-memory messages during a lengthy search-and-replace operation or when compiling an index or table of contents. As for saving disk space, Word 5's modular design makes pruning the program easy: simply drag any modules and converters you don't want out of the Word Commands folder (located in the Word folder). The grammar checker is one candidate for the Trash: it and its accompanying file use nearly a megabyte of disk space.

How to: WordPerfect WordPerfect runs in 800K of memory, but just like Word, it slows down. To save disk space, delete file converters you do not need by dragging them out of the Conversions folder. To access the Conversions folder, you open the System Folder, then the Preferences folder, and then the WordPerfect folder.

Customizing a word processor is one of those jobs that takes some time at first but pays off in the long run. As you create dictionaries, styles, and stationery; tweak menus and keyboard shortcuts; and write macros; you'll tailor your program to your writing habits. You'll create a word processor that feels just write. **m**

See *Where to Buy* for contact information.

Contributing editor JIM HEID looks at a different aspect of Mac fundamentals each month. His latest books are *Macworld Guide to Microsoft Word 5* and *Macworld Complete Mac Handbook*, both published by IDG Books Worldwide.

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Some Killer Tips to Crank Up Deneba's Latest Rev

You're probably good and tired of hearing Canvas 3.0 called the Swiss Army Knife of graphics programs. But that is a good analogy for a program that can open every Macintosh graphics-file format from MacPaint to EPS, and even a few IBM-file formats.

In an attempt to crowbar a reasonable interface onto all this power, Deneba Software has added some interesting twists to the standard Mac interface. You'll find not only hierarchical submenus, but even sub-submenus. Sometimes clicking on a tool palette icon makes a second palette pop out... and sometimes

clicking on an icon on that palette makes a third palette pop out. Good thing you can tear off the minipalletes and leave them open on the screen (if your monitor is big enough).

In other words, Canvas is a great program to mine for option-key tricks, special-effects nuggets, and other hidden secrets. Some of these tips are from graphics guru Deke McClelland, who went so far as to write *Canvas 3: The Book* (Peachpit Press, 1991). Others are from Deneba's resident artist, Dave Rumfelt, who has nested tool palettes running in his veins. (It's his work that adorns the Canvas 3.0 ads you

may have seen, including that zowie racing-car cross section.)

.....

Picking Apart Palettes

One basic concept before we start with the heavy-duty tips: let's demystify those bizarre color-palette icons on the left side of the screen once and for all. There are four of them, and it's no small feat figuring them out.

Pen Pat and Fill Pat—the top two palettes, which combine into one palette when you tear one of them off—refer to the outline and inside of shapes, respectively. Canvas uses the Pen Pattern for lines:

straight lines, the perimeters of circles, the outlines of polygons, and so on. The Fill Pattern is what goes inside the shapes. (The Fill Pattern is irrelevant when you draw lines.)

There are also Fore Color and Back Color, both on the bottom left palette. These terms refer to the dark and light portions of the patterns you choose from the Pen Pattern and Fill Pattern palettes. For example, in the brick pattern, the bricks' outline is black (Fore) and the bricks themselves are white (Back). The palettes let you change from black and white to color.

.....

Memory Management

Canvas's modular construction means you can leave out pieces that you won't need; each tool you omit saves RAM and loading time. To select which features will load, hold down the spacebar just after you double-click on the Canvas program icon. The Tool Picker will appear with a list of features, each of which you can toggle on or off. Here are a few you can jettison for starters.

If you're a Mac-only user, turn off the IBM file-format filters—CGM I/O, DXF I/O, IGES I/O. If Canvas is your only graphics program, turn off the other file-format filters: Canvas 1.0 I/O, Canvas 2.0 I/O, Illustrator I/O, MacDraw I/O, MacPaint I/O, Startup-Screen I/O, UltraPaint I/O. If

continues

Cool Effect with Steel and Glass

Deneba artist Dave Rumfelt tells how he created the shiny steel parts in the Canvas 3.0 ad.

1. Stack four rectangles, each narrower and lighter-colored than the other.

2. Choose Blend from the Object menu. Specify 25 copies with a constant blend and click on OK. Group the results (⌘-G).

3. Add an oval to the top; choose a light color and convert it to a Bézier shape (⌘-control-B). Duplicate it and place it at the bottom of the cylinder.

Double-click on this bottom oval to place it into editing mode.

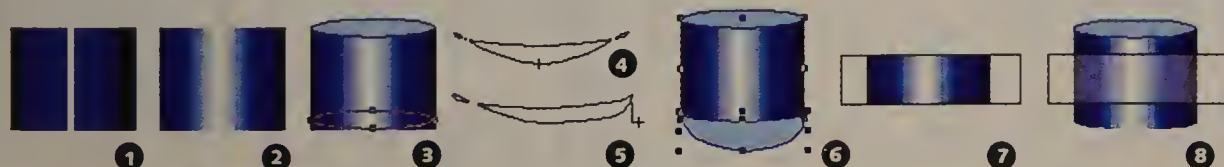
4. To shape the bottom oval into a curved tool to chop off the bottom of the cylinder, first drag the top handle downward past the lower edge of the oval.

5. Click on the rightmost handle; while pressing the tab key, drag the top tangent handle straight down, pulling the bottom lip of the "smile" out of the way, so that the top lip is a smooth curve. Repeat with the left side.

6. Shift-click on the cylinder; choose Subtract. Delete the smile.

7. To make the pane-of-glass effect, duplicate the cylinder. Drag a rectangle across it that has no fill. Select them both, then choose Intersect from the Combine command. Select the remaining chunk of cylinder.

8. From the Special Effects command, choose Tint Objects. Enter 35% in both boxes, set both Tint Toward boxes to white, and click on OK. Group the cylinder chunk with the rectangle, drag it to the original cylinder, and bring it to the front (⌘-F). Presto, steel and glass.



you're running in black and white, turn off the color tools: Dropper, Pantone Colors, RGB Color Manager, Separations. If you won't be needing text in this session, turn off the specialized text handlers: Bézier Text, Search & Replace, Spelling, Text Ruler, Text Utilities. If you're not using System 7, turn off the System 7 features: Balloon Help, System 7.0 Options. And if you're not drafting, turn off the special drafting tools: Dimensioning, Hatch Patterns.

Arrow-Minded

You may be frustrated by the fact that Canvas keeps taking your tools away from you. After you draw anything, Canvas automatically switches to the arrow tool. To switch back to the draw tool you just used, press the ⌘ key. And if Canvas's automatic arrow-selection feature is really getting you down, turn it off altogether. Choose Preferences from the File menu, click on

KEYBOARD SHORTCUTS

To switch temporarily to this tool . . .

hold down these keys

Dropper tool

option and tilde (~)

Grabber hand tool

spacebar

Zoom tool (magnifying glass)

⌘-shift-option

Text tool

⌘-option-T

the icon for General preferences, and check the box marked Retain Selected Tool.

Rules for Rulers

Sometimes it's important that your artwork be printed at a precise size. If this is the case, don't trust the on-screen rulers—yet.

First, choose Rulers from the Layout menu. In the dialog box that appears, use the Printer pop-up menu to specify whether you'll be using an ImageWriter- or LaserWriter-class printer. Now your documents should print at an accurate size. If you don't choose a printer, your printed drawing might be as much as 4 percent too big or too small.

And speaking of rulers—don't miss those slick rip-off rulers. Once you've got rulers displayed on the screen, hold down the option key, click on a ruler, and drag. A copy of the ruler peels off, so that you can place it anywhere in your drawing. To get rid of it, just drag it out of the workspace.

Adding Guidelines

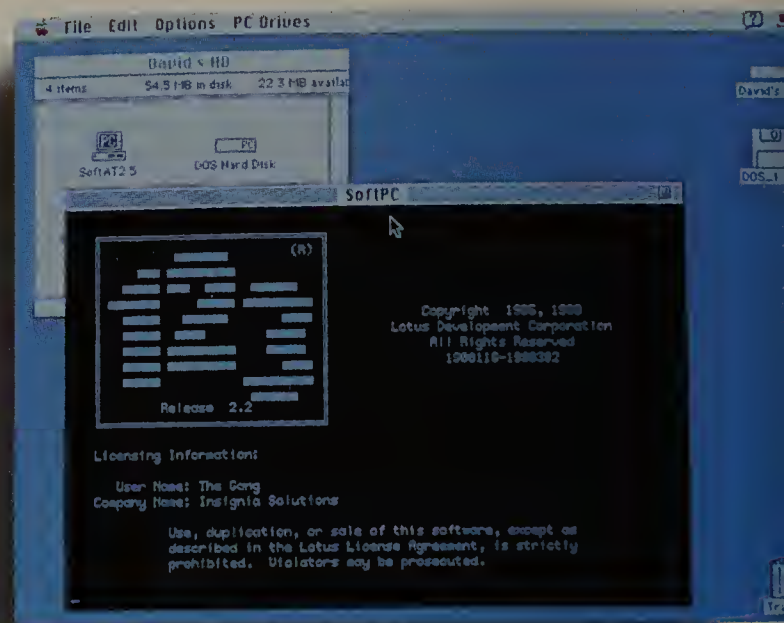
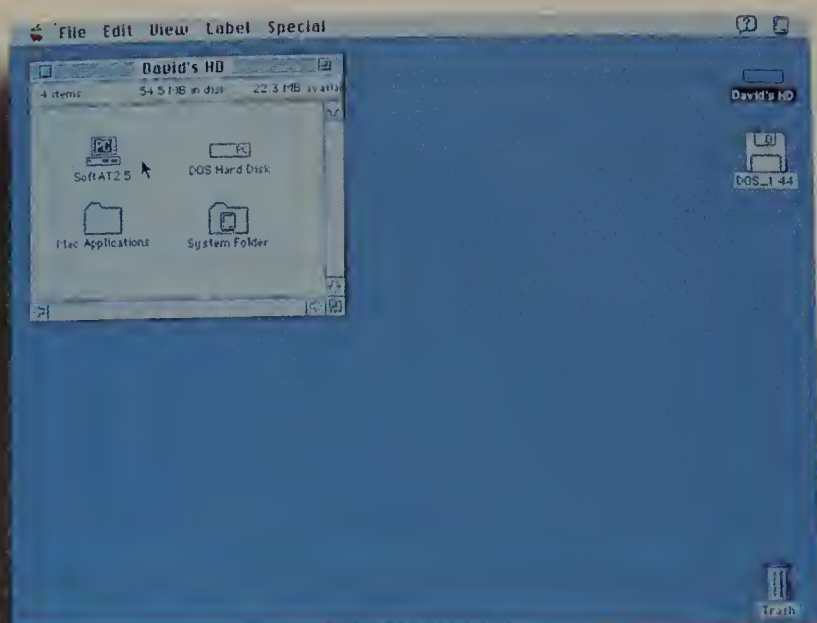
You can add nonprinting guidelines to a Canvas drawing just as you can in PageMaker, QuarkXPress, or other programs—by clicking on a ruler and dragging a guideline into the drawing area. That's pretty standard. What's more unusual is that once you've got some objects touching a guide,

you can move the guide and the objects all move along with it—provided you press the option key.

Layers for Speed

Like any graphics program, Canvas starts to bog down when you create lots of objects. There are four things you can do to keep its speed reasonable.

- Do as much work as possible in black-and-white mode.
- If you're finished with some elements of the drawing, send them to invisible layers. Select the elements (group them if you want). Choose Arrange from the Object menu, then from the Arrange pop-up menu choose Send to Layer, and then pick a layer from the submenu that appears. You can make that layer invisible by choosing Layer Specs from the Layout menu and deselecting the Visible check box.
- Stop those redraws. Any time Canvas starts to redraw the screen picture, you're not



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Click,
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And A PC.

Creating Text Outlines

1. To create wild text effects—and logos aplenty—start by selecting a text block. From the Object menu, choose Create Bézier's (Filled or Hollow).

TeachText

2. Ungroup the result. Double-click on any character's outline to edit it by dragging handles.

TeachText

3. Press enter to finish editing.

Teachtext

committed to waiting till it's finished. (For really complex drawings, one redrawing of the screen can be a several-minute proposition.) If all you want to do is use a menu, scroll again,

or work on part of the drawing that's already been redrawn, press ⌘-period (.) to interrupt the redraw. If you've stopped the screen when it's only partially drawn, press ⌘-K to redraw the whole thing.

▪ For maximum speed, choose Views from the Display menu, and choose Wire Frame from its submenu. (Or press ⌘-1.) It's like working in Adobe Illustrator: confusing, because you can't really tell how objects overlap, but fast.

Setting Objects Aside

If you're in a complex tangle of objects, and some are getting in your way, here's a quick way to toss them aside momentarily: group them, then press ⌘-right arrow, say, three times; each time, the selected group jumps 10 pixels (screen dots) to the right. Now that they're out of the way, you can work on the remaining objects unencumbered.

When you're ready to put the object group back in place,

select it and press ⌘-left arrow the same number of times as you pressed the right arrow. Not only does the group jump back precisely to its original position, but even its position in the front-to-back lineup remains intact. For added variety, you can use the other arrow keys, too. And if you press the option key instead of ⌘, the selected object jumps 50 pixels at a time instead of 10.

Multiple Objects at Your Command

Every now and then, you have to add dozens of identical objects to a drawing, like the leaves on a tree.

To do this quickly, draw one leaf, select it, and add it to the MacObject menu by choosing Add Macro from the Macro menu. Give it a name (like Leaf). Now choose it from the same menu. Place the cursor on your drawing, hold down ⌘, and start clicking away. You leave a leaf with each click.

Undocumented Centering Feature

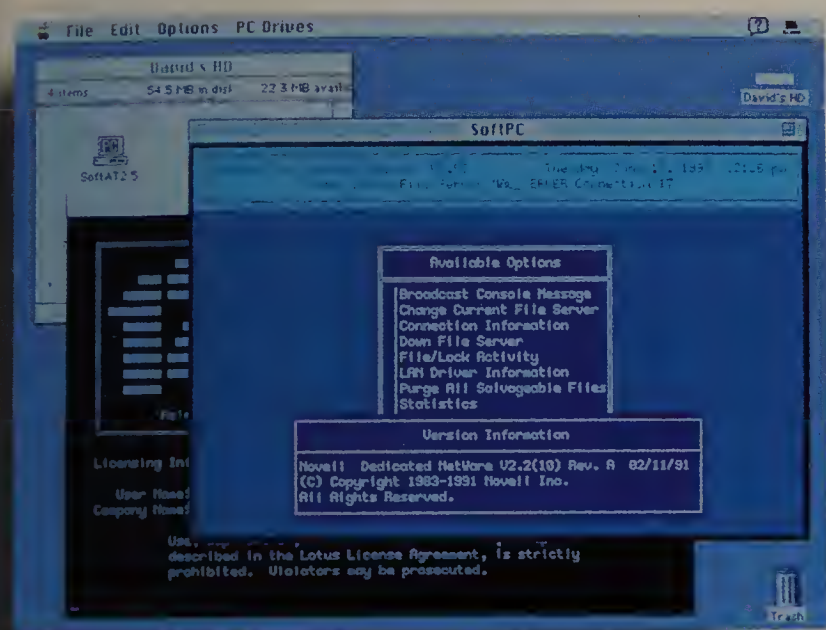
Select something. Using the Zoom Manager (the palette of zoom in/zoom out amounts), choose the same zoom level you already have. For example, if you're at double size (2:1), choose 2:1. The drawing shifts to place the selected object in the middle of the screen.

Aligning Objects

You can use the align tool to distribute tasks—provided you set them up beforehand using the menu command. In other words, one click on the align tool aligns the selected objects according to your most recent settings in the Alignment Specifications dialog box. **m**

See *Where to Buy* for contact information.

Contributing editor DAVID POGUE is a Macintosh music, graphics, and animation nut. He teaches magic, Mac, and music in New York.



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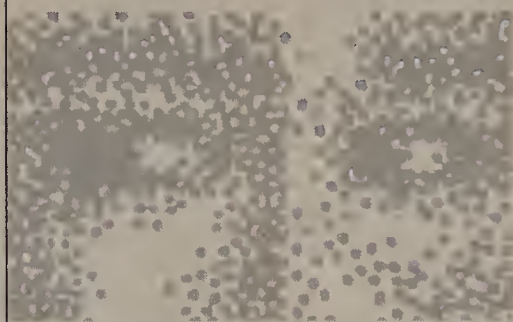
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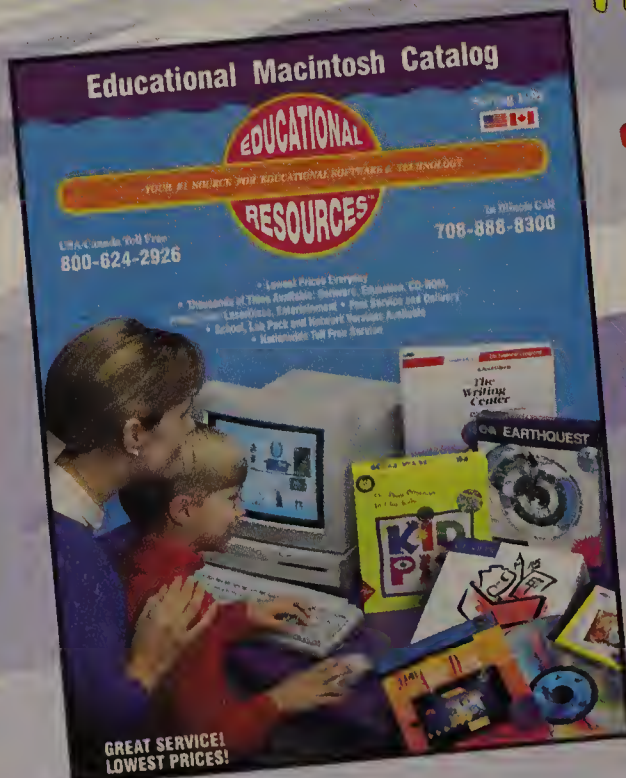
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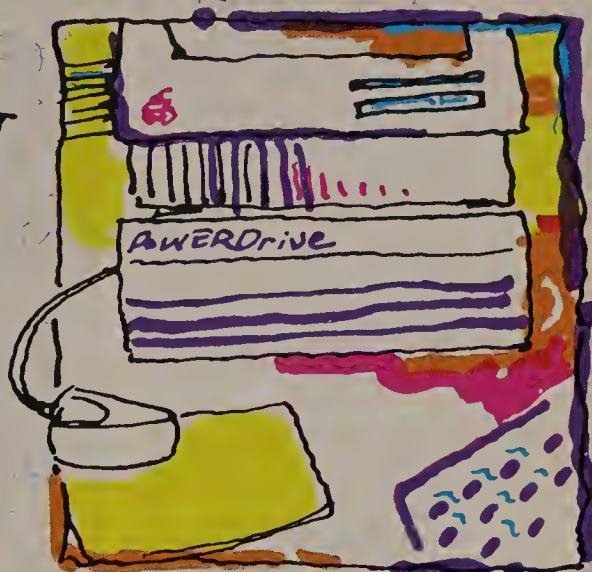
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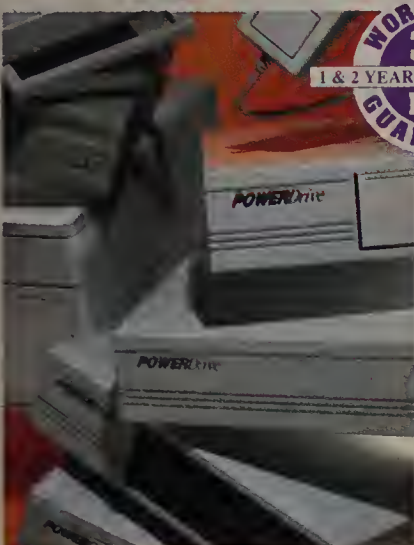
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POWERBOOK CASE.....	72
ARTICULATE SYSTEM	
VOICE NAVIGATOR II.....	565
VOICE IMPACT.....	78
VOICE IMPACT PRO.....	198
KEYTRONICS	
MACPRO PLUS.....	139
ORANGE MICRO	
GRAPPLER LS.....	67
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ULTRA 9600 MODEM & SMARTCOM.....	782
SMARTCOM II 3.3 for the MAC.....	82
HAYES CONNECT 3.0.....	46
PROMETHEUS	
MINIPLUS 2400 V.42 & MacKnowlege.....	128
24/96MSR FAX MODEM (MAXFAX).....	265
9600/9600M PLUS V.32/42 MNP5.....	665
ULTIMA14,400 BAUD MODEM/9600 FAX.....	685
SOFTWARE VENTURES	
MICROPHONE II 4.0.....	209

Storage

CHINON	
CDC-431 CD ROM REMOTE DRIVE.....	585
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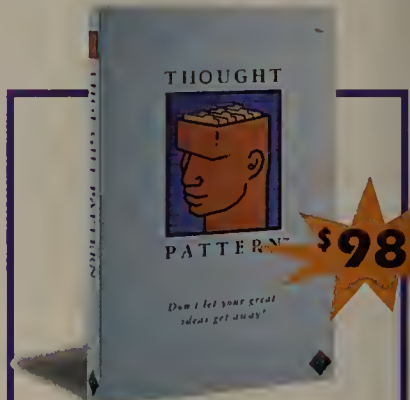
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COMPACT DESIGNS	
PROCLAIM.....	238
DELTAPOINT	
DELTA GRAPH PRO.....	186
FISHER IDEA SYSTEMS	
IDEAFISHER 2.0.....	384
JIAN	
BIZ PLAN BUILDER.....	78
LIVING TRUST BUILDER.....	84
EMPLOYEE MANUAL MAKER.....	84
MEYER SOFTWARE	
ON THE AIR.....	126



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NUBASE.....	174
PARAGON	
NISUS 3.0.6.....	238
NISUS COMPACT 3.3.....	96
SENSIBLE SOFTWARE	
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AMERICAN HERITAGE DICTIONARY.....	48

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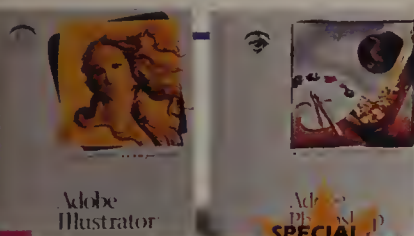
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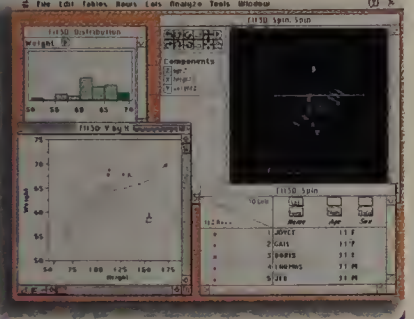
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TOUCHBASE.....69

CD TECHNOLOGY

AMERICA ALIVE(CD).....69

CHENA SOFTWARE

FAIR WITNESS 1.1.....299

EASTGATE SYSTEMS

FONTINA BOSTON SIX33

FWB

HARD DISK TOOLKIT134

ICOM SIMULATIONS

ON CUE II56

SHERLOCK HOLMES CD39

MICROMAT

MAC EKG 2.0.....65

MICROSPOT

MACPALETTE II52

MACPLOT PEN PLOTTER PRO. 4.0276

MACPLOT PEN PLOTTER STANDARD133

MULTI AD SERVICES

MULTI-AD SEARCH108

NINE TO FIVE SOFTWARE

REPORTS 2.193

RESCUE63

PC PC

NETSTREAM.....188



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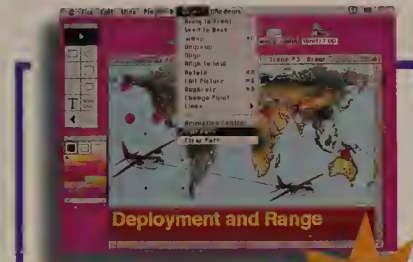
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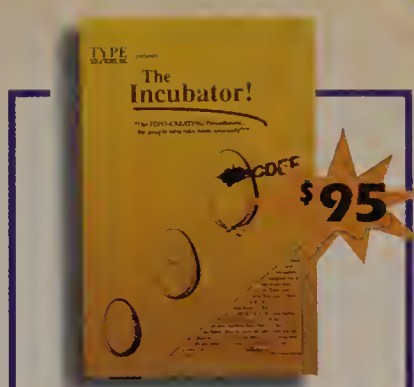
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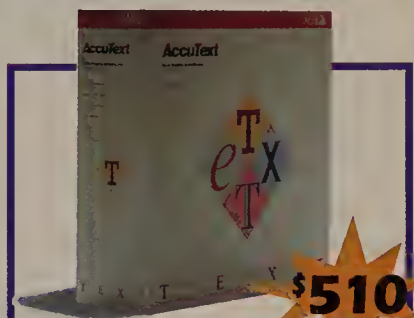
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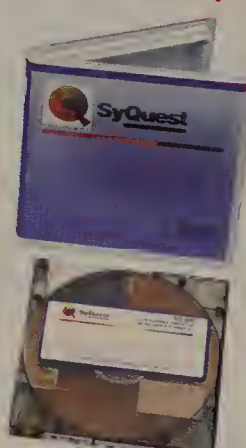
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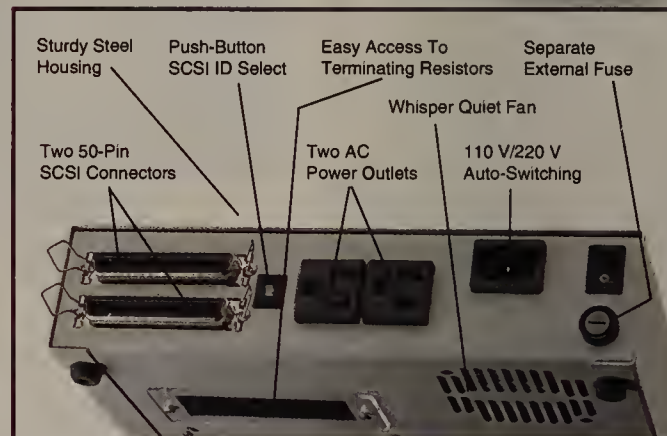
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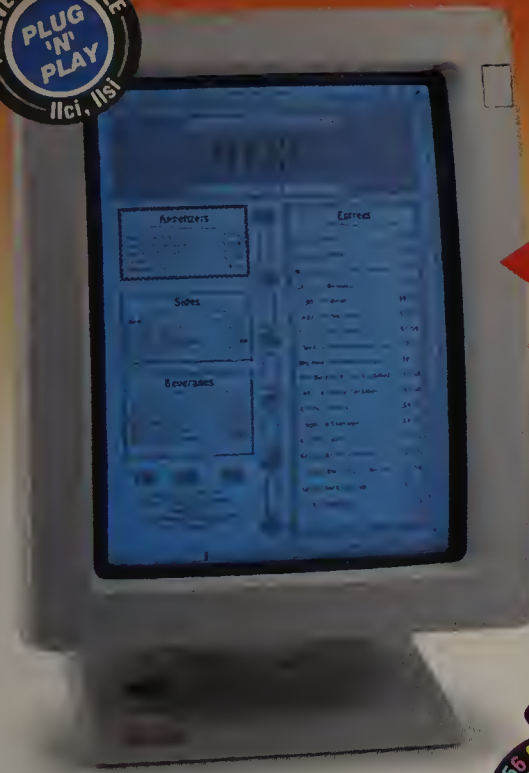
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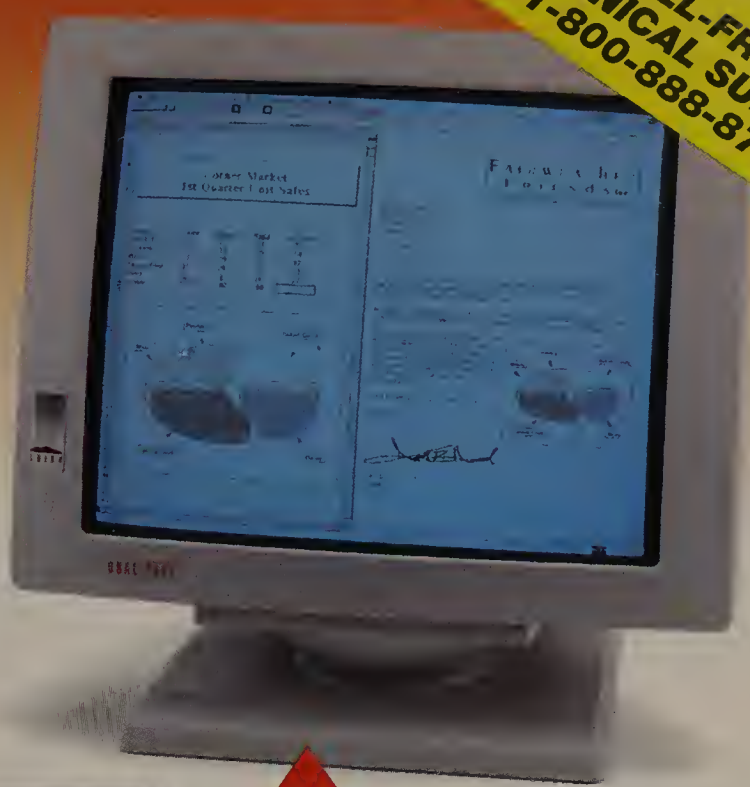
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ETC 120 Mb Maxtor Cheyenne, 15 msec	\$359
ETC 120 MB Quantum LPS, 11ms	\$439
ETC 213 Mb Maxtor LXT, 15 msec	\$589
ETC 240 Mb Quantum LPS, 11ms	\$739
ETC 340 Mb Maxtor LXT, 13 msec	\$1009
ETC 425 Mb Quantum PRD, 9 msec	\$1269
ETC 535 Mb Maxtor LXT, 13 msec	\$1449
The drives below can be used in the Mac II, IIfx, IIcx, IIfx & IIfx	
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ETC 613 Mb WREN-5, 16.5 msec	\$1349
ETC 676 Mb WREN 6, 15.5 msec	\$1399
ETC 676 Mb WREN-Runner-2, 12 ms	\$1649
ETC 760 Mb Maxtor, 13ms	\$1499
ETC 1.2 Gb Seagate, 15ms	\$1899
ETC 1.2 Gb Maxtor Panther, 13 msec	\$2169
ETC 1.7 Gb Seagate, 15ms	\$2399
ETC 1.7 Gb Maxtor, 13ms	\$2489
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ETC 52 Mb Quantum LPS, 12 msec	\$299
ETC 80 Mb Maxtor Drive	\$389
ETC 105 Mb Quantum LPS, 12 msec	\$429
ETC 120 Mb Maxtor Cheyenne, 15 msec	\$429
ETC 120 Mb Quantum LPS, 11ms	\$519
ETC 213 Mb Maxtor LXT, 15 msec	\$659
ETC 240 Mb Quantum LPS, 11 ms	\$809
ETC 340 Mb Maxtor LXT, 13 msec	\$1069
ETC 425Mb Quantum PRD, 9 msec	\$1339
ETC 535 Mb Maxtor LXT, 13 msec	\$1509
ETC 307 Mb WREN-4, 14 msec	\$1279
ETC 337 Mb WREN-Runner-1, 10.7 ms	\$1429
ETC 613 Mb WREN-5, 16.5 msec	\$1499
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ETC 676 Mb WREN-Runner-2, 12 ms	\$1799
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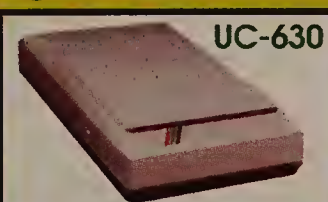
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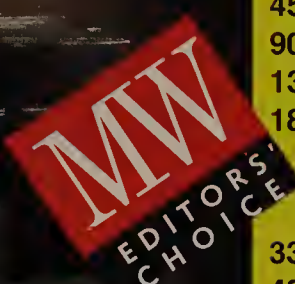
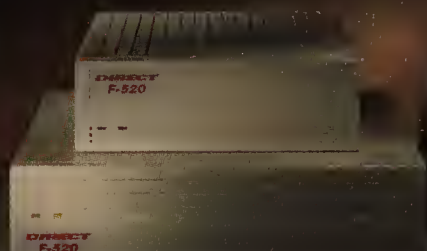
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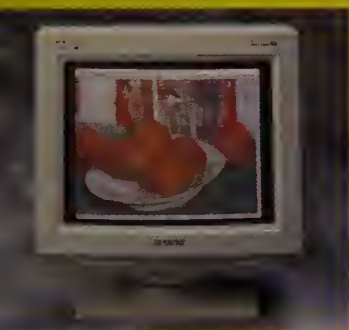
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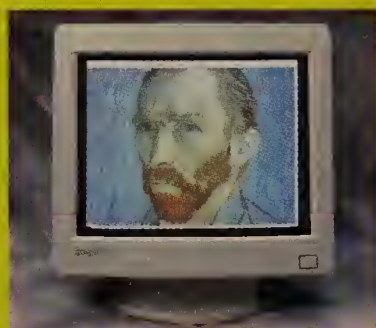
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22	Curtis Manufacturing	20	603/532-4123	290-291	MacNews	—	800/243-9383	238	Synex	204	800/447-96
76	Dantz Development	26	510/849-0293	287	MacProducts USA	—	900/420-3636	12	T B S P	25	800/755-TB
242	Data Products	191	800/334-3174	292-293	MacProducts USA	—	800/MAC-USA1	8	T/Maker Company	174	415/962-01
200	Dataviz	36	800/733-0030	88-95	Mac Zone, The	70	800/248-0800	234	Teknosys	142	800/873-34
5	Deneba Software	57	800/6CANVAS	274	Macs Now	171	800/766-2313	236-237	Tektronix	143	800/835-61
85	Design CAD	336/337	918/825-4848	286	MacSource	48	800/285-2622	134	Texas Instruments	313	800/527-35
279	DGR Technologies	—	800/235-9748	280-281	MacTel Technologies	105	800/950-8411	284-285	Thirdwave	156	800/284-04
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259	Digital Vision	242	800/346-0090	295-301	Macworld Expo Boston	—	—	330	World Expo	—	—
262-263	Dr. Mac	—	800/825-6227	248	Mathsoft, Inc.	34	800/628-4223				
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341 342 343 344 345 346 347 348 349 350

351 352 353 354 355 356 357 358 359 360
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201 202 203 204 205 206 207 208 209 210
211 212 213 214 215 216 217 218 219 220
221 222 223 224 225 226 227 228 229 230
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391 392 393 394 395 396 397 398 399 400

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61 62 63 64 65 66 67 68 69 70
71 72 73 74 75 76 77 78 79 80
81 82 83 84 85 86 87 88 89 90
91 92 93 94 95 96 97 98 99 100

101 102 103 104 105 106 107 108 109 110
111 112 113 114 115 116 117 118 119 120
121 122 123 124 125 126 127 128 129 130
131 132 133 134 135 136 137 138 139 140
141 142 143 144 145 146 147 148 149 150

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Page No.	Advertiser	Reader Svc. No.	Page No.	Advertiser	Reader Svc. No.	Page No.	Advertiser	Reader Svc. No.	Page No.	Advertiser	Reader Svc. No.
SOFTWARE			PERSONAL			DISPLAY			MISCELLANEOUS		
BUSINESS			71	Attain Software	—	212	Chinon America, Inc.	94	331	Educorp	157
71	Attain Software	—	16	MacFriends	—	246	Nikon	—	38	Hunt Manufacturing	199
104	Caere Corporation	73	252	MacFriends	—	EXPANSIONS/UPGRADES			SERVICES		
240	Computer Associates	10	100	MacFriends	—	205	E-Machines	303	ON-LINE		
17	Frame	60	245	MacFriends	—	276-277	Express Direct	—	107-108	America On-line	—
248	Mathsoft, Inc.	34	16	MacFriends	—	198	In Focus Systems, Inc.	—	73	CompuServe	319
FC-01	Microsoft	—	SECURITY			41	Lapis	202/204	TRADESHOWS/CONFERENCES		
203	Peachtree Software	100	239	Secure-It	239	275	Express Direct	—	253	CD ROM Expo	—
77	StatSoft	99	STATISTICAL			IBC	Mirror Technologies	125	295-301	Macworld Expo Boston	—
238	Synex	204	239	Abacus Concepts	50	82	Mobius Technologies	89	TRAINING		
12	T B S P	25	77	StatSoft	99	10-11	NEC Technologies	68	20	MacAcademy	106
249	Zedcor	161	UTILITIES			97	Outbound Systems	219	ACCESSORIES		
CAD/CAM			243	Avery Dennison	160	6-7	RasterOps	—	FURNITURE		
85	Design CAD	336/337	106	Berkeley Systems Design	218	231	Sharp Electronics	47	4	Anthro	—
26	Engineered Software	12	76	Dantz Development	26	39	Sigma Desgins	176	MISCELLANEOUS		
78	Graphsoft	46	14-15	Fifth Generation Systems	135	13	Applied Engineering	167	243	Avery Dennison	160
228	Innovative Data Design	129/229	211	Fifth Generation Systems	151	101	Xante	119	22	Curtis Manufacturing	20
248	Mathsoft, Inc.	34	105	GDT Softworks	42	HARD DISKS/STORAGE			302	DGR Technologies	—
CD ROM			86	Microcom, Inc.	41	278	APS	15	38	Hunt Manufacturing	199
329	Quantum Leap Technologies	136	21	Now Software	13	87	Contemporary Cybernetics	188	C6	Kensington Microware Ltd.	—
COMMUNICATION			98-99	Salient	39	279	DGR Technologies	—	70	NoRad	133
130	C E Software	—	74	Symantec	96	261	Hard Drives International	—	26	Scanco	—
200	Dataviz	36	24	Symantec	166	27-34	La Cie	—	MAIL ORDER		
DATA MANAGEMENT			234	Teknosys	142	268-269	MacDirect	—	289	Advanced Business Center	—
249	Zedcor	161	VERTICAL			264-265	MacLand	40	329	Agfa	—
EDUCATIONAL			235	Bimillennium	233	292-293	MacProducts USA	—	278	APS	15
260	Educational Resources	28	12	T B S P	25	196	MicroNet Technology, Inc.	113	282-283	BottomLine Distribution	—
35	Prescience	179	WORD PROCESSING			72	O.C.E.A.N. Microsystems	131	279	DGR Technologies	—
-fonts			37	Nest Software	177	126-127	Pinnacle Micro	266	262-263	Dr. Mac	—
249	Altsys	35	8	T/Maker Company	174	25	PLI	208	260	Educational Resources	28
133	Image Club	—	MISCELLANEOUS			250-251	Storage Dimensions	1	331	Educorp	157
GRAPHICS/DTP			105	GDT Softworks	42	284-285	Thirdwave	156	261	Hard Drives Internatiol	—
329	Agfa	—	HARDWARE			INPUT DEVICES			266	Mac and More	85
122	Aldus	—	BOARDS			22	Curtis Manufacturing	20	88-95	Mac Zone, The	70
249	Altsys	35	13	Applied Engineering	167	BC	Kensington Microware Ltd.	—	216-223	Mac's Place	209
36	Calliscope	—	41	Lapis	202/204	MODEMS			274	MacBest	98
5	Deneba Software	57	280-281	MacTel Technologies	105	132	Global Village	9	294	MacCenter	—
259	Digital Vision	242	244	Orange Micro	33	232	Logiccode Technology, Inc.	—	46-69	MacConnection	—
17	Frame	60	193	Radius	—	PRINTERS			267	MacDepot	—
133	Image Club	—	195	Radius	178	209	Canon USA	110	268-269	MacDirect	—
228	Innovative Data Design	129/229	18	SuperMac Technology	132	242	Data Products	191	264-265	MacLand	40
37	Nest Software	177	79	SuperMac Technology	88	302	DGR Technologies	—	290-291	MacNews	—
254A	RayDream	159	COMPUTER SYSTEMS			189	GCC Technologies	212/221	292-293	MacProducts USA	—
40	Strata	293	42-45	Apple	—	191	GCC Technologies	231/232	287	MacProducts USA	—
LANGUAGES			80-81	Apple	—	187	GCC Technologies	260/262	274	Macs Now	171
235	Bimillennium	233	282-283	BottomLine Distribution	—	120	LaserMaster Corporation	182	286	MacSource	48
MULTIMEDIA			276-277	Express Direct	—	290-291	MacNews	—	280-281	MacTel Technologies	105
40	Strata	293	274	MacBest	98	9	Microtek Labs, Inc.	63	138-145	MacWarehouse	270
NETWORKING			16	MacFriends	—	136	NEC Technologies	180	288	Printer Connection	55
84	Compumation Inc.	198	252	MacFriends	—	214	NewGen Systems, Inc.	74/75			
183	Insignia Solutions	72	100	MacFriends	—	288	Printer Connection	55			
6-257	Insignia Solutions	216	245	MacFriends	—	6-7	RasterOps	—			
124	Insignia Solutions	235	275	MacNews	—	236-237	Tektronix	143			
258N	Pacer Software	91	287	MacProducts USA	—	134	Texas Instruments	313			
			274	Macs Now	171	VIDEO					
			286	MacSource	48	109	Canon USA	164			
			96	Outbound Systems	30	128	Envisio	222/224			
			DIGITIZERS/SCANNERS			244	Orange Micro	33			
			104	Caere Corporation	73	193	Radius	178			
						195	Radius	—			
						250-251	Storage Dimensions	1			
						79	SuperMac Technology	88			



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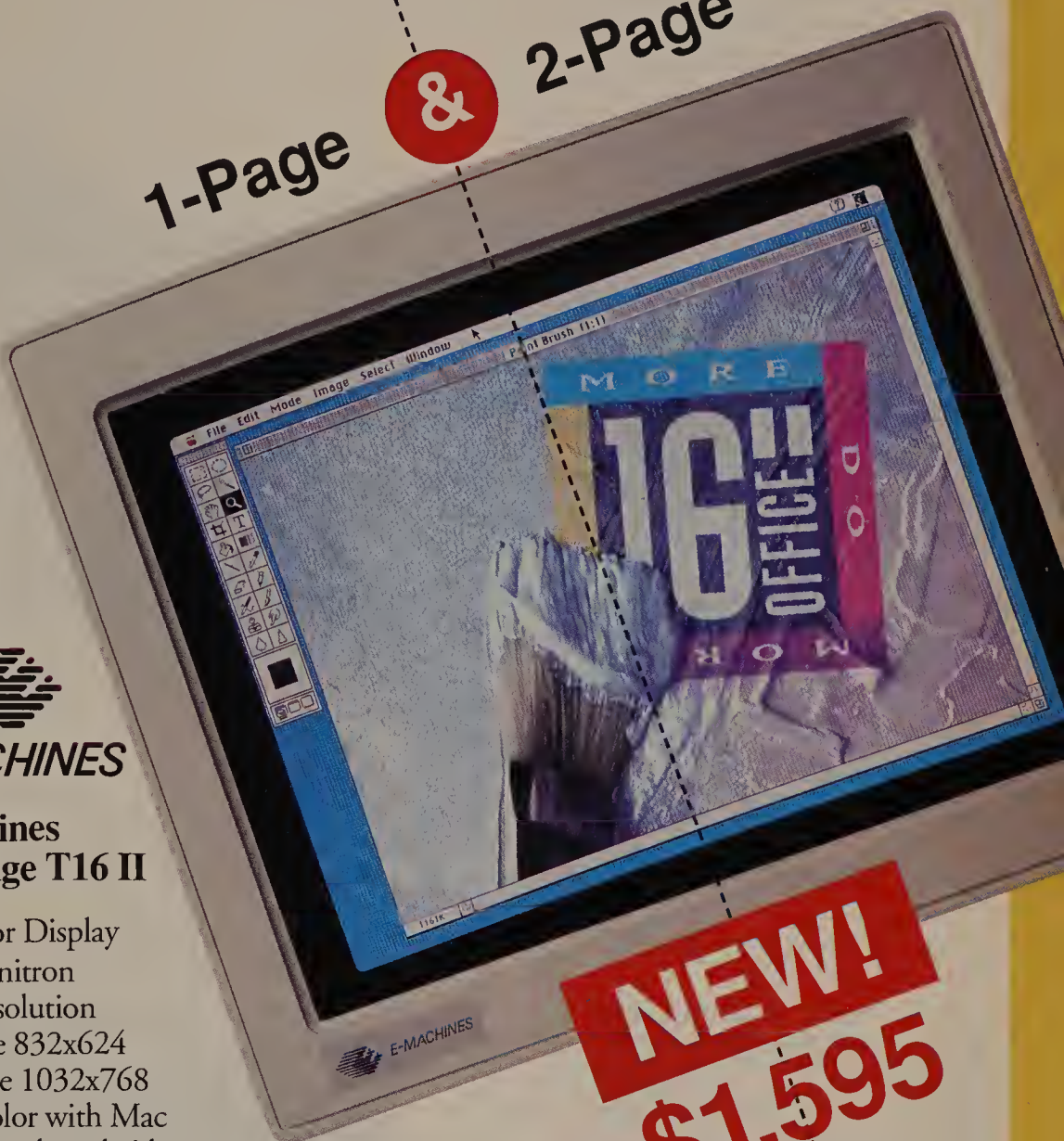
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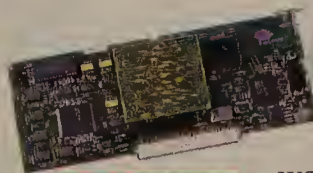
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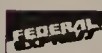
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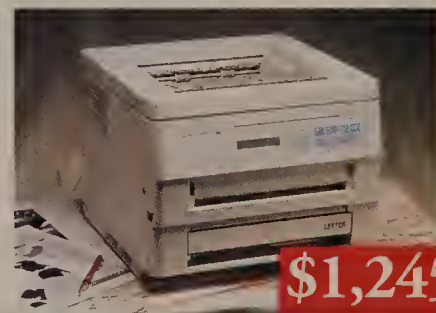
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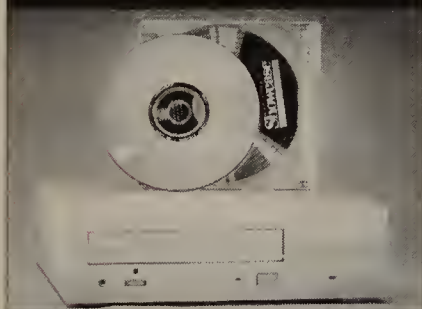


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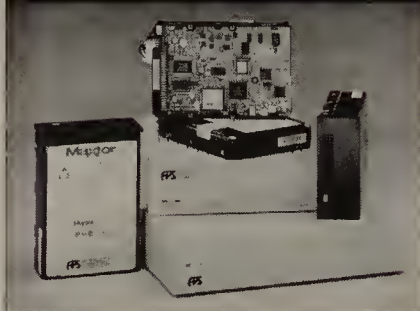
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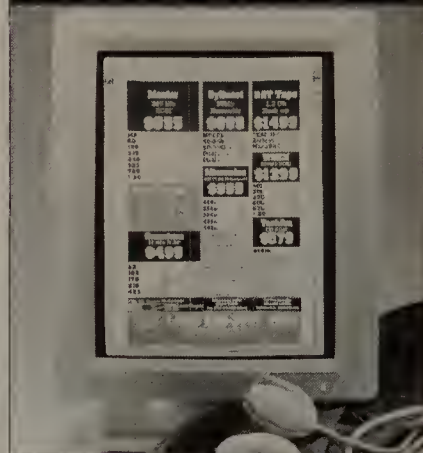
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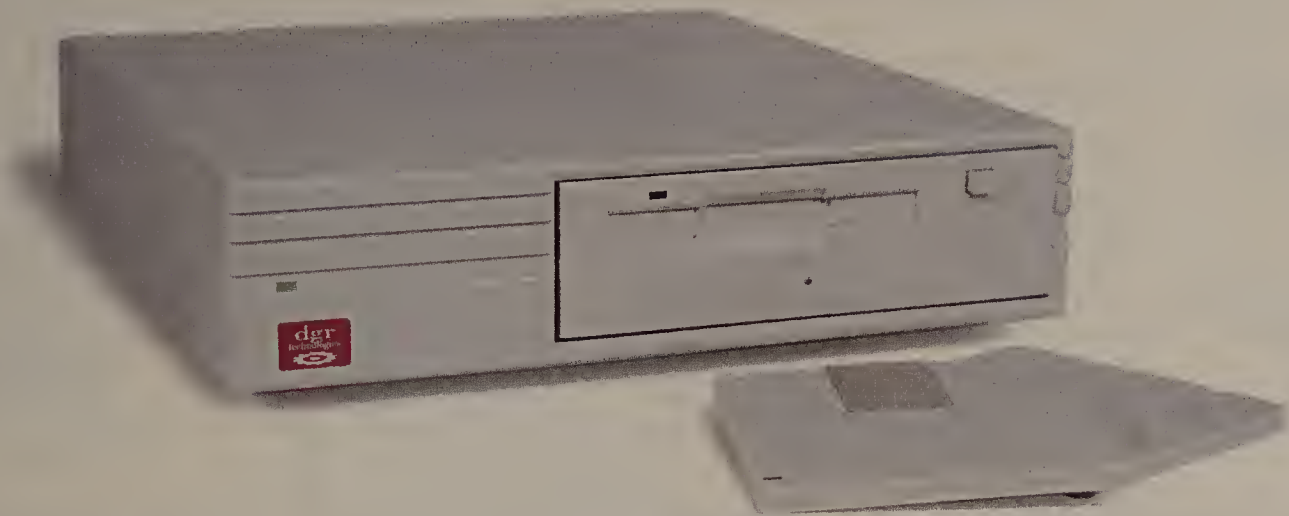
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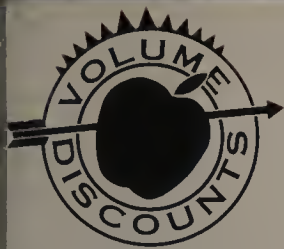
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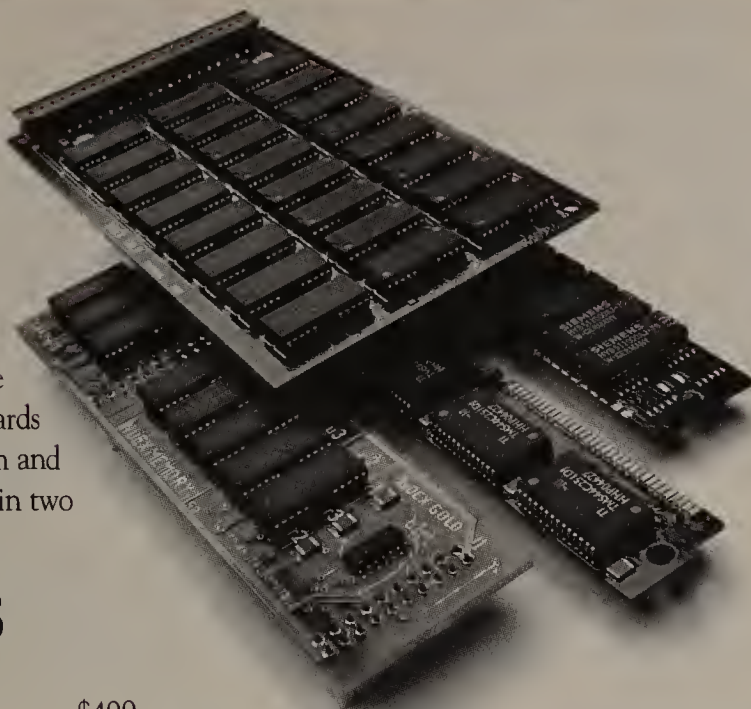
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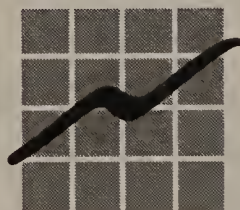
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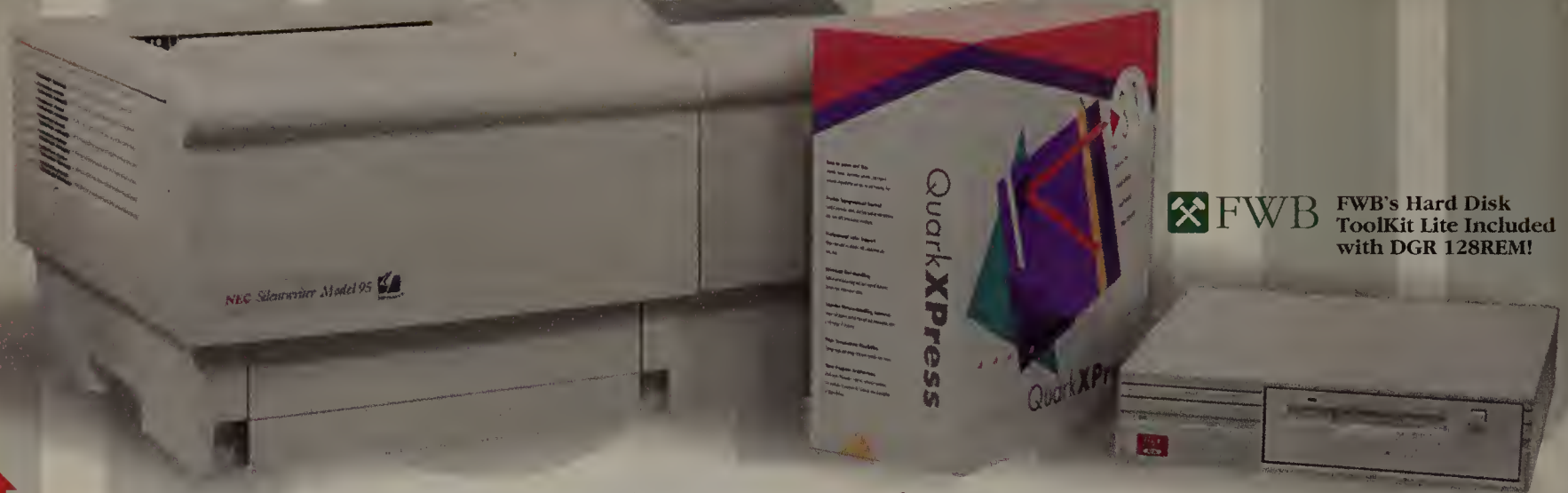
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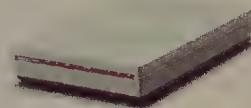
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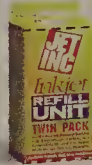
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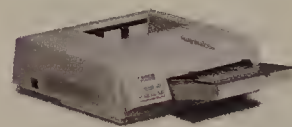
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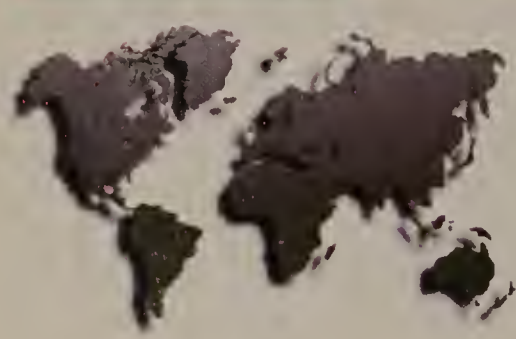
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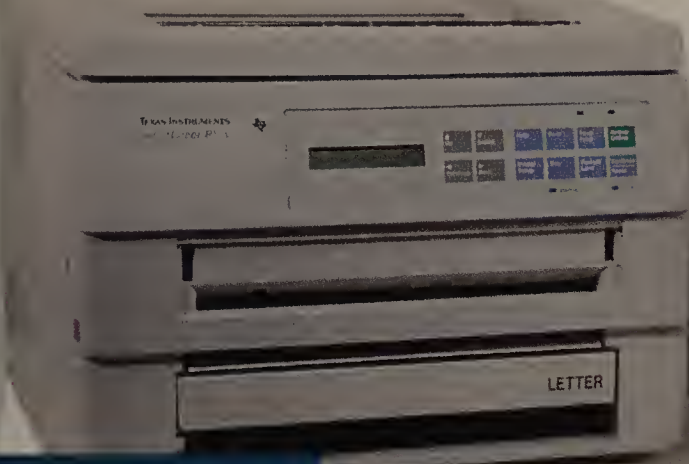
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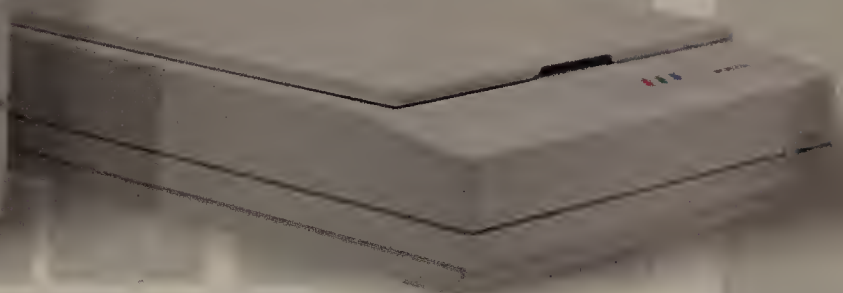
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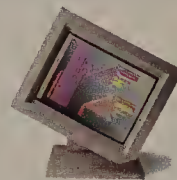
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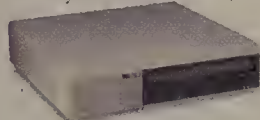
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Chinon CD-ROM 525
NEC CDR-36 w/ Type Gallery 469
NEC CDR-73 616
PLI CD ROM 636
Toshiba CD-ROM XM 3201A 685

Microsoft Office - CD ROM 574
Type Gallery PS 229
NEC Clip Art 3-D 221
SOFTWARE
4th Dimension 2.2 469
Adobe Illustrator 3.2 w/ATM 335
Adobe PhotoShop 2.0 515
Adobe Type Manager 2.0.2 54
Adobe Type Reunion/Streamline2 36/115
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Aldus Gallery Effects 129
Aldus Persuasion 2.0 299
At Once! 1.2 177
Canvas 3.0 239
Carbon Copy 2 Pack 153
Claris Works 184
DiskFit Pro 67
Disk Doubler 3.7 39
Disk Top 4.0 62
Farallon Media Tracks 171
Far Side Calendar 46
Fastback Plus 2.6 115
FileMaker Pro 181
FilmMaker 399
Fontographer 3.3 249
FontMonger 65
Foxbase +Mac 2.01 265
Fractal Design Painter 234
FrameMaker 642
Lotus 1-2-3 Minimal Packaging 89
Mac Academy Training Tapes 39
MacDraw Pro 249
Mac Globe 39
MacProject II 2.5 329

Macromind Director 3.0 618
Macromind Accelerator 125
Macromind MediaMaker 449
MacWrite Pro 299
Managing Your Money 4.0 177
MasterTracks Pro 239
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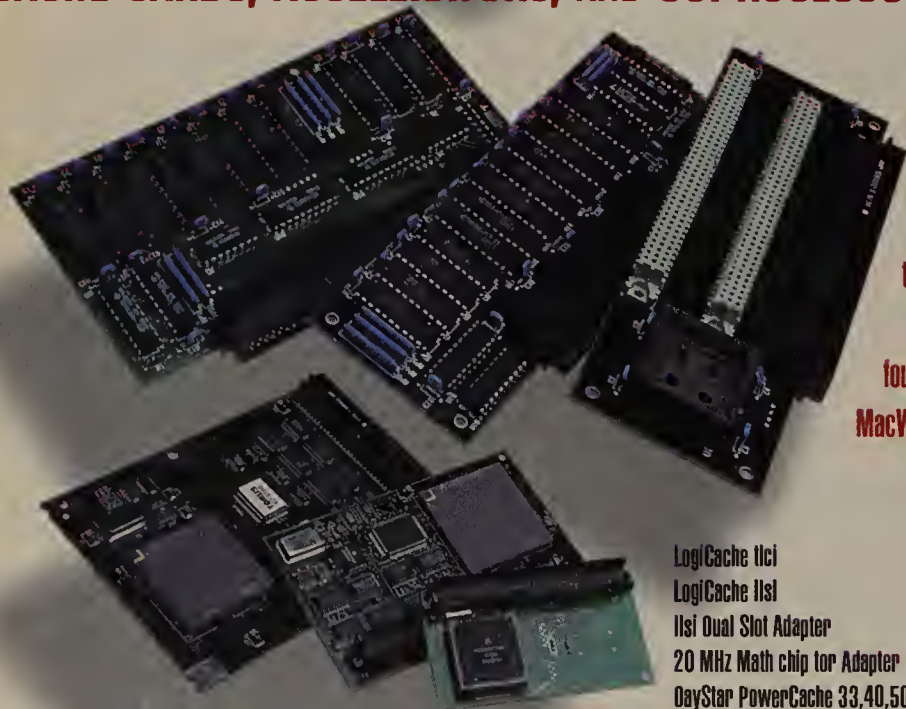
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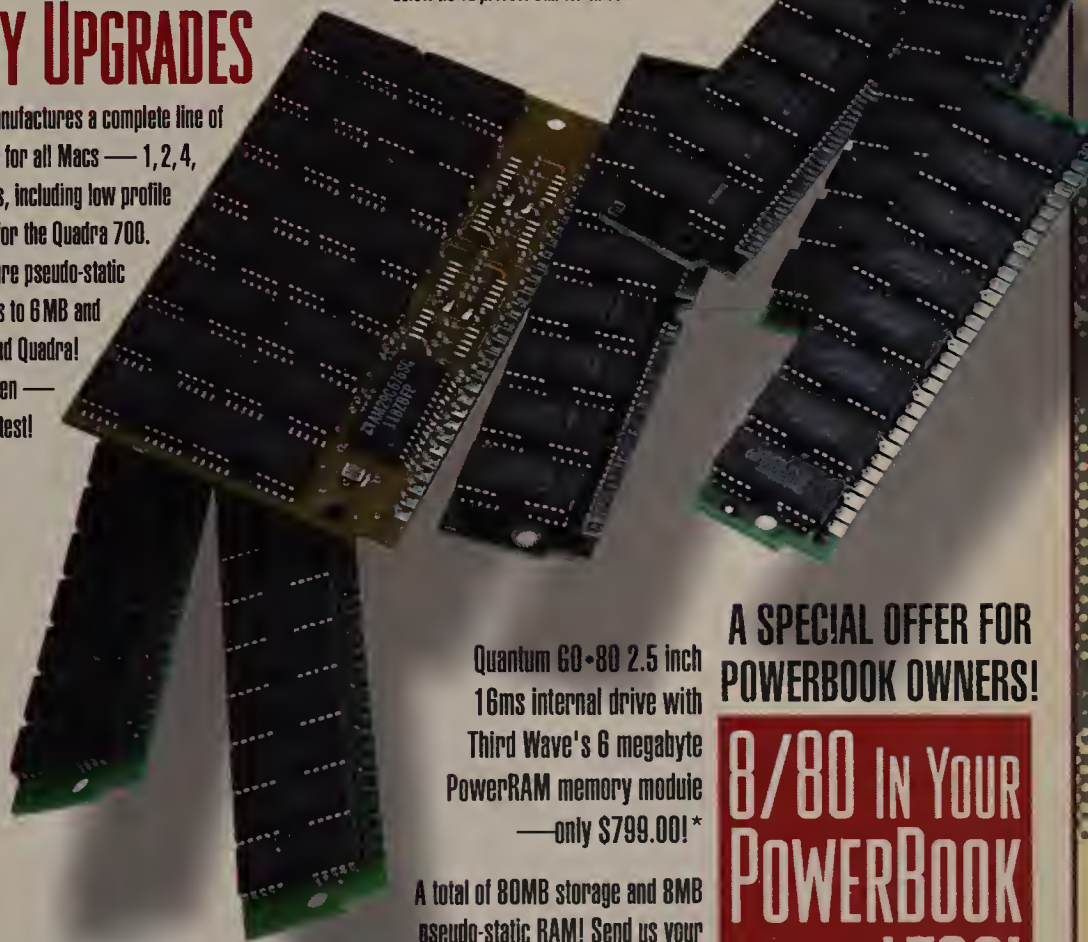
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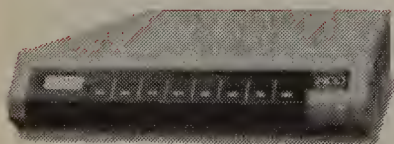
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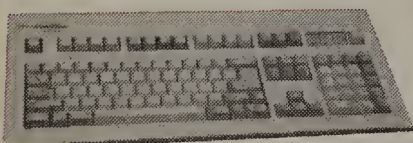


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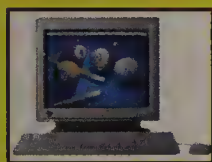
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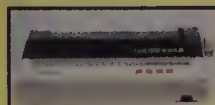
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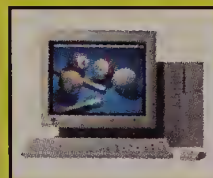
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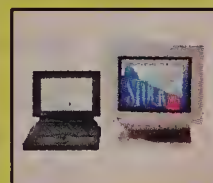
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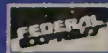
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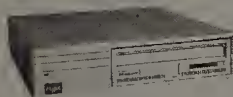
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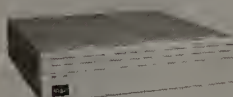
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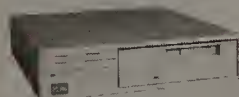
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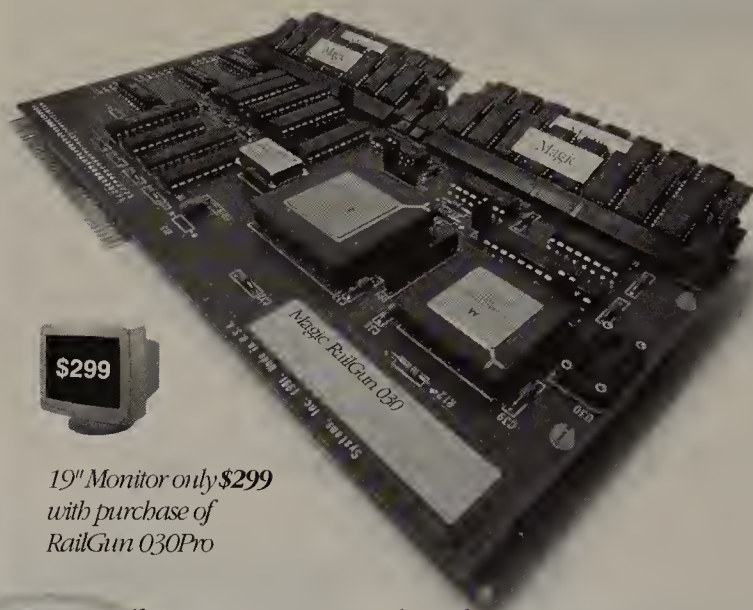
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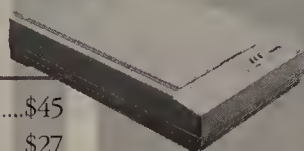
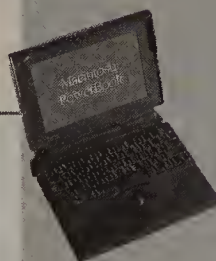
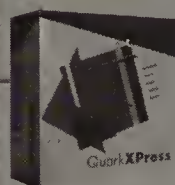
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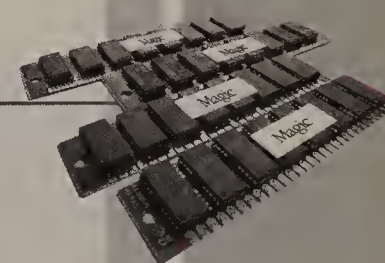
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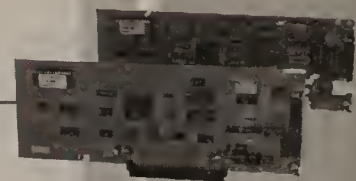
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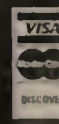
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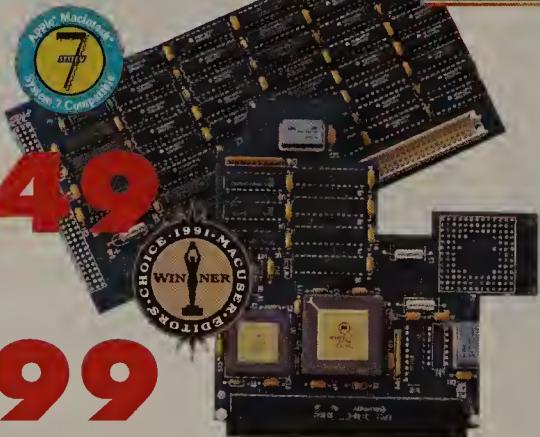
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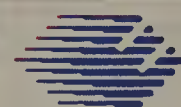
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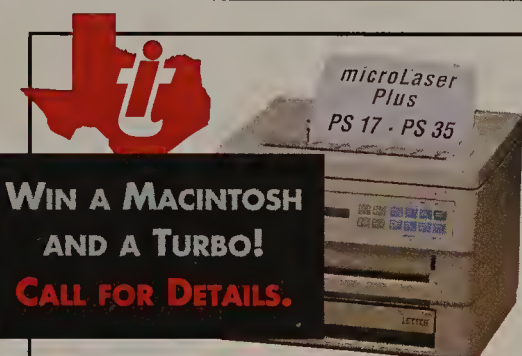
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4. **The How-to-Get-Started Conference.** Complete guidelines for those who are brand-new to the Mac, or need a concentrated lesson on popular Mac applications.
5. **The Advanced User Conference.** Experienced users share their expertise to reveal hot new ideas and insider's tricks.
6. **The You-Asked-for-It Conference.** Fact-filled sessions covering the latest market developments and responding to your special requests — including the perennial favorite, MUSE (MACWORLD Expo User Group Extravaganza).
7. **The Connectivity Conference.** Users share insights on solving connectivity problems, and vendors discuss new developments in networking that will impact your business, your bottom line, and your Macintosh.

8. **The Big Business Conference.** Sessions dedicated exclusively to solving the problems of Mac users in large organizations — focusing on databases, executive information systems, software licensing, MIS issues, and more.

9. **The Home Office/Small Business Conference.** Hard-learned lessons on how to reduce the chaos in a Mac home/small business, along with a look at hardware and software especially designed to save you time and money.

10. **The Entertainment Conference.** Trends, how-to's, and exciting examples of the Mac's uniquely helpful role in music, desktop video, production, and more. The Mac can slash your costs!

11. **The Special Interest Group Conference.** For "birds of a feather" looking to compare Mac notes with others in a similar setting — you can solve special problems, see how colleagues across the country are getting more mileage out of the Mac, and develop an invaluable "user network."

12. **The Education Conference.** A complete mini-conference program in one! Twelve education-specific sessions make this the world's largest and most information-rich collection of Macintosh topics designed especially for educators. An excellent and unprecedented opportunity for educators, administrators, and students nationwide to show and be shown new and classic examples of the Mac as a teaching tool — including multimedia, CD-ROM, HyperCard, networking, and QuickTime for teachers.

And don't miss the UGWUMP

(User Group Welcoming/Unwinding/Meeting Place)

— MACWORLD Expo's "People Networking Parlor" for user groups. Share success stories, exchange newsletters and literature. Learn how to start a user group in your area!

Seeking more Macintosh excitement
at MACWORLD Expo/Boston
1992? Just turn the page...

**MACWORLD
EXPOSITION**



PREREGISTER FOR MACWORLD Expo/Boston

BY JUNE 26 AND SAVE \$10 TO \$15

The largest Macintosh event in the world will be in Boston from Tuesday, August 4 through Friday, August 7 at the World Trade Center and the Bayside Expo Center. And when you preregister by June 26, you'll save time and money.



Please choose your package and fill out the form completely. Incomplete forms will be returned. **One form per person; make photocopies for additional people.** Please do not staple check to form. Send completed forms to:

MACWORLD Expo/Boston,
P.O. Box 4010, Dedham, MA 02026.

Registration forms received after June 26 will be returned. **PURCHASE ORDERS CANNOT BE ACCEPTED. ALL REGISTRATION FEES ARE NONREFUNDABLE.** Call the MACWORLD Expo/Boston Hotline at (617) 361-3941 for more information.

Please register me for:

☐ **Package One \$75**

Conference sessions* and exhibits. Preregister by June 26 (\$90 cash only at the door).

U.S. Attendees: You will be mailed your badges on or about July 20. Be sure to check box indicating where badge should be sent. All other badges will be held at the Preregistration Counter at the Bayside Expo Center for pickup beginning Monday, August 3.

International Attendees: If you're preregistering from outside the U.S. and want your badge sent to you instead of picking it up at the Bayside Expo Center, check the appropriate box below and add \$45 to your preregistration fee. Fill in your exact street address (no P.O. boxes) and

include your telephone number and country code. We will Federal Express your badge directly to you.

Bonus for All Attendees: All registration fees include a six month, \$7.50 paid subscription to MACWORLD Magazine. (The basic subscription rate is \$30 for 12 issues.) Just stop by one of the MACWORLD Magazine booths during the Expo, fill out the special 6-issue card, and drop it off. If you don't fill out this card, we can't send you your 6 issues of MACWORLD.

☐ **Package Two ~~\$30~~ \$20**

Admission to exhibits only. Preregister by June 26 (\$30 cash only at the door).

☐ (Check if applicable.) I'm an International attendee and would like my badge shipped by Federal Express. Enclosed is an additional \$45.

Please send my registration badge and further information to:

Please check one: ☐ Home Address ☐ Company Address

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Street Address _____

City _____ State _____ Zip _____

Country (Other than U.S.) _____ Telephone _____

If mailing to company address:

Title _____

Company _____

☐ Check enclosed (make payable to MACWORLD Exposition) Amount \$ _____

☐ Master Card ☐ Visa ☐ American Express Amount \$ _____

Account Number _____

Expiration Date (include all numbers) ____/____/____

Card Holder Signature (Signature necessary to be valid) _____

If card holder is other than registrant, please print cardholder's name below:

Last Name _____ First Name _____

Cash only at the door. After June 26, you must register at the show.

Please check the appropriate information:

Your industry or profession

- 01. ☐ Advertising
- 02. ☐ Arts/Entertainment
- 03. ☐ Business
- 04. ☐ Communications/publishing
- 05. ☐ Consultant
- 06. ☐ Distributor/dealer/retailer/service
- 07. ☐ Engineering
- 08. ☐ Government
- 09. ☐ Health services
- 10. ☐ Higher Education
- 11. ☐ Information services
- 12. ☐ K-12 Education
- 13. ☐ Legal services
- 14. ☐ Manufacturer (computer industry)

15. ☐ Manufacturer (non-computer)

16. ☐ Other (specify) _____

Your title

- 17. ☐ CEO/President/VP
- 18. ☐ DP/MIS Manager
- 19. ☐ Manager/Department head
- 20. ☐ Network Manager
- 21. ☐ Programmer/analyst
- 22. ☐ Engineer/R & D
- 23. ☐ Consultant
- 24. ☐ Marketing/sales
- 25. ☐ Educator
- 26. ☐ Art director/graphics
- 27. ☐ Editor/writer

28. ☐ R & D

29. ☐ Student

30. ☐ Other (specify) _____

Size of your organization (number of employees national and international)

- 31. ☐ Under 50
- 32. ☐ 50-99
- 33. ☐ 100-499
- 34. ☐ 500-999
- 35. ☐ 1,000-5,000
- 36. ☐ Over 5,000

Which personal computer(s) do you own/use?

- 37. ☐ Macintosh (128K, 512K(E))
- 38. ☐ Macintosh Plus

39. ☐ Macintosh Classic/Classic II

40. ☐ Macintosh LC

41. ☐ Macintosh SE/SE 30

42. ☐ Macintosh II/IIx

43. ☐ Macintosh II si

44. ☐ Macintosh II cx/ci

45. ☐ Macintosh II fx

46. ☐ Macintosh Quadra Series

47. ☐ Macintosh Portable/

Powerbook Series

48. ☐ Apple II Series

49. ☐ IBM PC (or compatible)

50. ☐ None

51. ☐ Other (specify) _____

*MACWORLD Expo conference sessions are on a first-come, first-served basis with no guaranteed seating and are subject to change without notice. All registration fees are nonrefundable. Do not staple check to form. Send completed form, with check or money order to: MACWORLD Expo, P.O. Box 4010, Dedham, MA 02026.

SAVINGS, DISCOUNTS AND CONVENIENCE For MACWORLD Expo/Boston 1992

Tuesday, August 4 - Friday, August 7, 1992 at The World Trade Center and Bayside Exposition Center

We're pleased to offer a complete package of savings, discounts and convenience to make your MACWORLD Expo/Boston experience even more enjoyable. Let's start by getting you to Boston—



Substantial savings are available when you fly American Airlines to MACWORLD Expo/Boston. As the official airline of MACWORLD Expo, American is again pleased to offer discounts of 5% to 45% on your fare. Dial 1-800-433-1790 and ask for Star File # S-0172AL. You'll automatically receive the preferred rates.

Hertz Discounts

If you're planning to rent a car, you'll get a great rate from Hertz. Call 1-800-654-2240, ask for meeting # 10468, and tell the reservations operator you're attending MACWORLD Expo.

Limousine Service

Luxury limousine and executive sedan services are available. Contact First American Limousine And Towncars Sedan Service @ 1-800-547-5466 for reservations.

Hotel Accommodations

Participating hotels in the Boston area are offering MACWORLD Expo discounts. To receive the preferred rates, simply call one of the hotels listed below and mention you're going to MACWORLD Expo. There's a

limited number of rooms available at preferred rates, so make your plans early! Published rates are starting rates: see hotels listed below.

All Aboard for the MACWORLD Expo Shuttle!

MACWORLD Expo's Boston locations are The World Trade Center, 164 Northern Avenue and Bayside Exposition Center, 200 Mount Vernon Street. Complimentary and convenient shuttle bus service connects you with both locations. Please check with the concierge at your hotel for the best way to make use of the shuttle service.

Downtown Shuttle Stops:

Copley Square - Corner of St. James & Dartmouth Streets (C)

Boston Common - Corner of Boylston & Tremont Streets (B)

Shuttle Schedule:

August 4 - August 6, 1992

9am-11am Downtown Morning Shuttle

9am-6pm Bayside Expo Center & World Trade Center Express

5pm-7pm Downtown Evening Shuttle

August 7, 1992

9am-11am Downtown Morning Shuttle

9am-3pm Bayside Expo Center & World Trade Center Express

2pm-4pm Downtown Evening Shuttle

(Please note: the shuttle schedule listed above is subject to change. Check the MACWORLD Expo/Boston Program & Buyers Guide on site for updated information.)

Preregistration Savings

Preregister for MACWORLD Expo/Boston by June 26 to save \$15 on all Conference Sessions* and Exhibits (\$75 now vs. \$90 cash at the door), or \$10 on Exhibits-only admission (\$20 now vs. \$30 cash at the door). When you preregister, you receive your admission badge in advance so you can walk right into MACWORLD Expo. There's no waiting in line.

Early Bird Registration

If you miss the preregistration deadline on June 26, you can still register before the start of the show to avoid long lines! On-site Early Bird Registration is from 11 a.m. - 3 p.m. on August 3, at the full registration rates of \$90 (cash at the door) for all Conference Sessions* and Exhibits, and \$30 for Exhibits-only admission (cash at the door).

More Information

To listen to prerecorded information about MACWORLD Expo/Boston 1992, call the MACWORLD Expo Information Hotline at 617-361-3941. (24 hours per day, seven days a week.) We'll see you in Boston!

Show Hours

Exhibition:	Conference:
Aug. 4: 10 a.m. - 6 p.m.	10 a.m. - 6 p.m.
Aug. 5: 10 a.m. - 6 p.m.	10 a.m. - 6 p.m.
Aug. 6: 10 a.m. - 6 p.m.	10 a.m. - 3 p.m.
Aug. 7: 10 a.m. - 3 p.m.	

Hotels

57 Park Plaza (B)
482-1800; \$100/\$110
Back Bay Hilton (C)
236-1100; \$150/\$170
Best Western
731-4700; \$99/\$109
Boston Marriott Copley (C)
236-5800; \$185/\$205
Boston Park Plaza Hotel
& Towers (B)
426-2000; \$125/\$145
Charles Hotel
864-1200; \$176/\$186
Colonnade (C)
424-7000; \$150/\$170
Copley Plaza (C)
267-5300; \$175/\$195
Four Seasons (B)
338-4400; \$215/\$235

Guest Quarter Suites (H)
783-0090; \$150/\$170
Hilton at Dedham Place
329-7900; \$125/\$135
Holiday Inn Boston/Brookline
277-1200; \$110/\$120
Holiday Inn/Government Center (B)
742-7630; \$141/\$157
Holiday Inn Randolph (H)
961-1000; \$87/\$95
Howard Johnson/Southeast (H)
288-3030; \$75/\$85
Hyatt Regency Cambridge (H)
492-1234; \$145/\$145
Lafayette Hotel (B)
451-2600; \$160/\$180
Lenox Hotel (C)
536-5300; \$145/\$165
Logan Airport Hilton
569-9300; \$135/\$135

Marriott Long Wharf
227-0800; \$219/\$239
Meridien (B)
451-1900; \$195/\$205
Midtown Hotel (C)
262-1000; \$109/\$119
Omni Parker House (B)
227-8600; \$145/\$165
Ritz Carlton (B/C)
536-5700; \$195/\$195
Royal Sonesta Cambridge
491-3600; \$140/\$140
Sheraton Boston (C)
236-2000; \$142/\$142
Sheraton Tara Braintree (H)
848-0600; \$99/\$99
Tremont House (B)
426-1400; \$105/\$120
Westin Copley (C)
262-9600; \$170/\$190

Legend:

All phone numbers are in the 617 area code.

Rooms are priced for single and double occupancy.

(C) = Hotel is within walking distance of Copley Square Shuttle Location.

(B) = Hotel is within walking distance of Boston Common Shuttle Location.

(H) = Hotel is providing its own shuttle service to MACWORLD Expo

(check with hotel directly for specifics).

*All conference sessions are on a first-come, first-served basis with no guaranteed seating.

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CREATIVE VISION IN A CHANGING WORLD

*Save \$15 on Exhibits and Conferences or \$10 on Exhibits Only
Admission for MACWORLD Expo/Boston 1992: Preregister by June 26!*

When you look out over the exhibit floor at MACWORLD Expo, it's like looking through a kaleidoscope. Just a slight turn to the left or right, and you get an entirely new and fantastic view. In every direction, there's something different. Something dynamic. Something daring.

These new and fantastic sights are what MACWORLD Expo is all about: presenting a creative vision to stay ahead of our changing world. At MACWORLD Expo, the Macintosh becomes a kaleidoscope, an instrument of constant change and fascination.

What You Seek Is What You Get

As the world's largest Macintosh event, MACWORLD Expo showcases uses and applications for the MAC in Networking, Spreadsheet analysis, Databases, Education, Research, Word processing, Accounting, Law, CAD/CAM, Forecasting, Design, Publishing, Illustration, Animation, Music, Programming, Entertainment and Multimedia (to name but a few.)

What you seek is what you get: you'll find all the latest in hardware, software, peripherals and services at MACWORLD Expo!

MACWORLD Expo/Boston 1992: When and Where

This year's MACWORLD Expo/Boston promises to be bigger and better than ever. Over 400 companies will cover 300,000 square feet of space at Boston's World Trade Center and Bayside Exposition Center. Mark your calendars for **August 4 - August 7** to see the Macintosh at its absolute best.

The Conference Program

In addition to the 400-company strong Exhibition, MACWORLD Expo/Boston also offers a complete Conference Program of intensive seminars. Guided by a distinguished faculty comprised of those who truly lead the Macintosh industry, as well as cutting-edge users who are driving the demand for technology, the Conferences offer insights that are simply not available anywhere else. You can expect to come away from the MACWORLD Expo Conference series smarter, more productive, and inspired!

A+ for Education

If your specialty is education, assign yourself to MACWORLD Expo's MacResource Center. Sponsored by Apple Computer, Inc. and A+ Publishing, the Center is a place for Macintosh-

using educators to take a break from the show floor, discover new software solutions and receive a complimentary copy of the Official MACWORLD Expo Guide to Educators. Visit the Center and you may be eligible to win free software, Apple gifts, or a new Macintosh Classic II and StyleWriter printer.

If You're Used to Looking at Life Through a Window, May We Recommend a Kaleidoscope?

If you're a committed DOS user, MACWORLD Expo/Boston still has something for you. First, you'll see for yourself the unique advantages offered by the Macintosh; you'll find solutions on the MAC that are just not possible with DOS. You'll also learn about MAC/DOS connectivity and how to take advantage of the best of both systems. To put the power of Macintosh to work for you, make your MAC connection at MACWORLD Expo/Boston!

MACWORLD Magazine Subscription Bonus

When you register for MACWORLD Expo/Boston, your registration fee automatically includes a six-month, \$7.50 paid subscription to MACWORLD Magazine. (The basic subscription rate is \$30 for 12 issues.) To activate your subscription, just stop by one of the MACWORLD Magazine booths during the Expo and fill out the special six-issue subscription card. Your first personal copy of MACWORLD Magazine will be on the way.

Don't Miss Out on Incredible Preregistration Savings

Preregister NOW for MACWORLD Expo/Boston to take advantage of incredible savings! When you return the attached preregistration card with your payment by June 26, you'll save \$15 on all Conference Sessions* and Exhibits (\$75 now vs. \$90 cash at the door). Preregistration not only saves you money, it also saves you time. When you preregister, we send you your admission badge early so you can walk right into MACWORLD Expo. No fuss. No waiting. You can get a jump on the 50,000 people expected at this year's Expo!

The deadline to receive your preregistration discount is fast approaching. So fill out the attached form today and send it in with your payment by check or credit card. And if the registration form is missing from this ad, or if you have any other questions, just call the prerecorded MACWORLD Expo Information Hotline at 617-361-3941. Then get ready to see Macintosh's creative vision in a changing world. You'll see wonderful things through the kaleidoscope of MACWORLD Expo.

MACWORLD
EXPOSITION



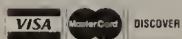
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Catalog Product Index

Hardware

Bar Code	308
Computer Systems	308
Memory Upgrade	313
The LLB Co.	314
Peripherals	317
Relax Technology	318-319
Printers	320

Software

Astrology	320
Bar Code	320
Business	321
CAD/CAM	321
CD-ROM	321
Clip Art	321
Communications	322
Computer Shopping	322
Desktop Publishing	322
Educational	322
Entertainment	323
Fonts	323
Genealogy	323
Graphics	323
Graphics Translators	324

Hyper Card Stacks	324
Import/Export	324
Languages	324
Medical	324
Music/Midi	324
Property Management	325
Public Domain	325
Religion	325
Sales/Marketing	326
Scientific	326

Services

Computer Insurance	326
Computer Repair	326
Data Conversion	326
Data Recovery	326
Desktop Publishing	327
Laser Recharge	327

Accessories

Cases	327
Converters	328
Covers	328
Diskettes	328
Furniture	328
Supplies	328

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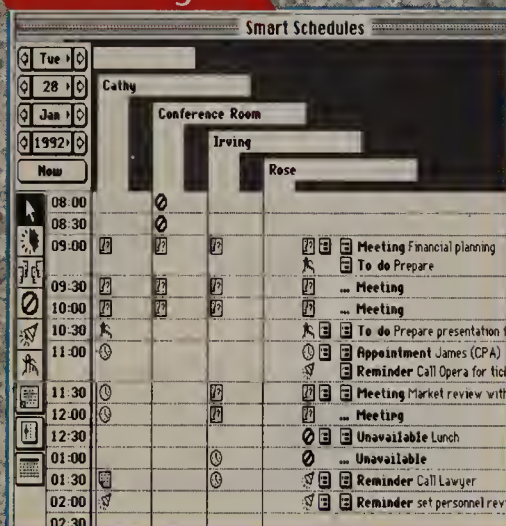
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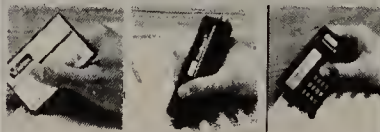
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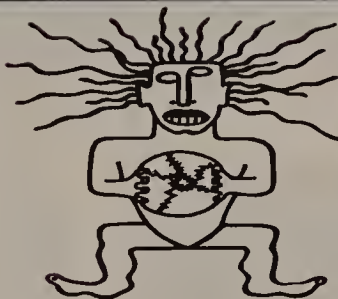
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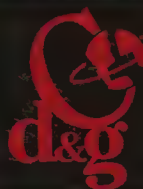
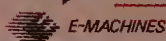
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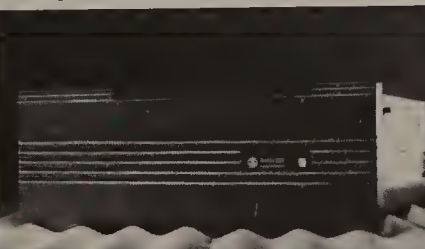
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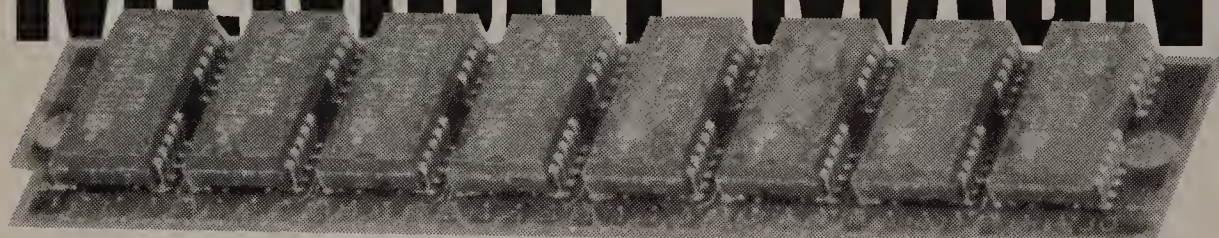
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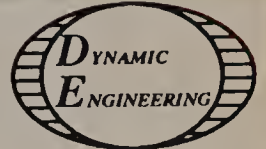
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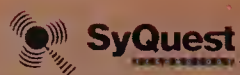
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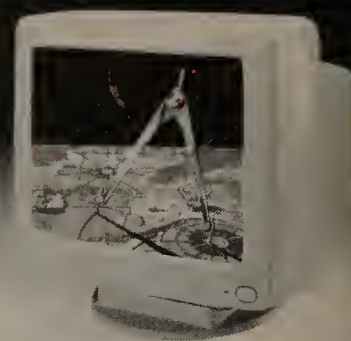
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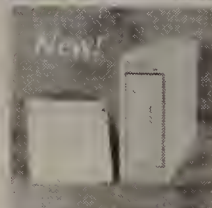
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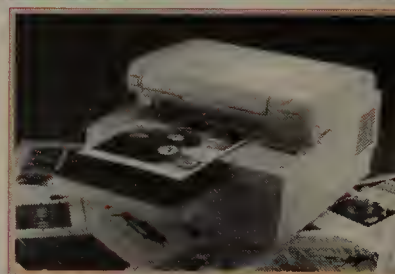
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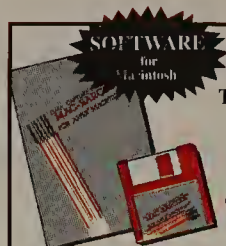
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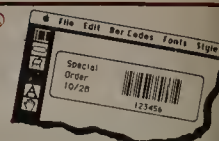
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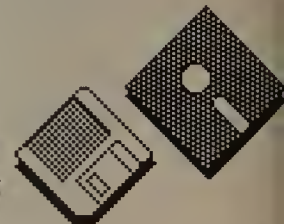


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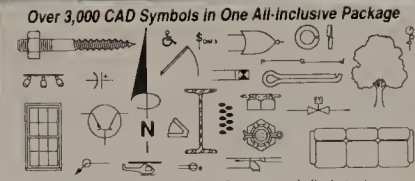
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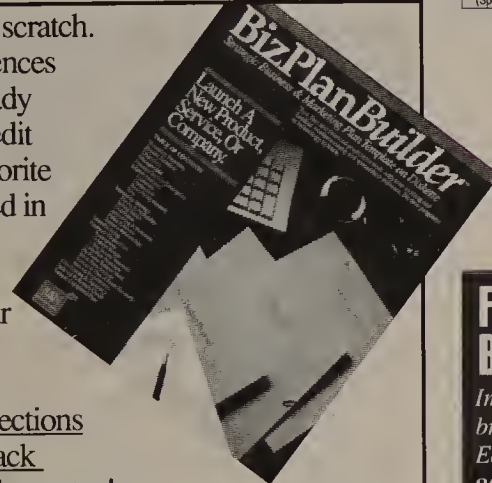
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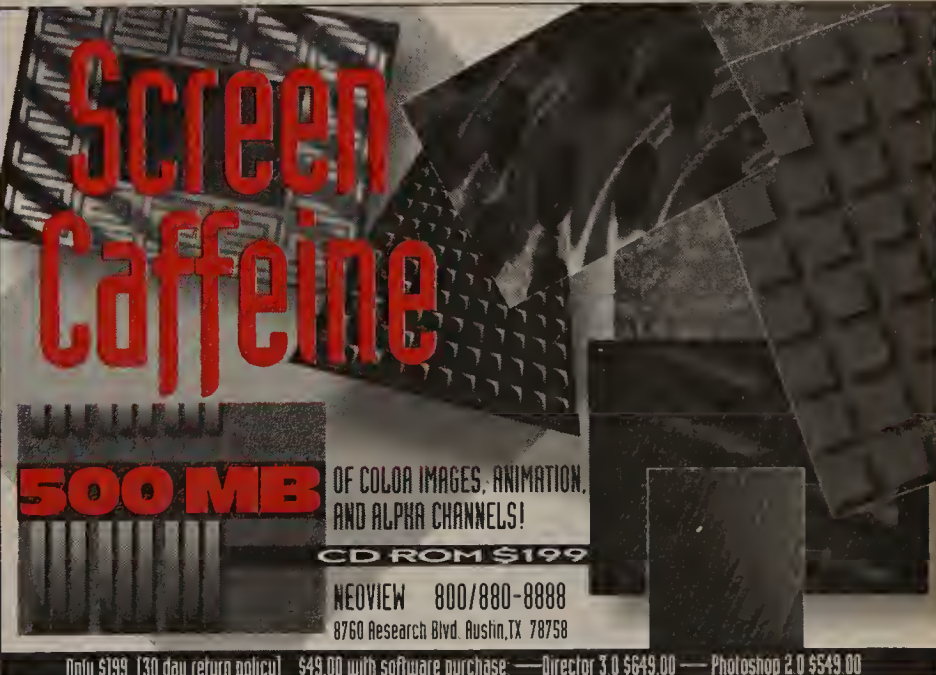
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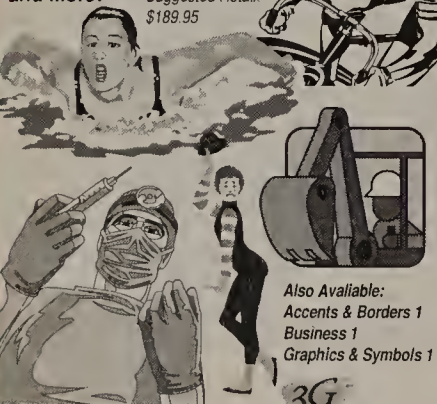
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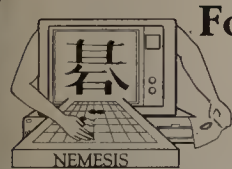
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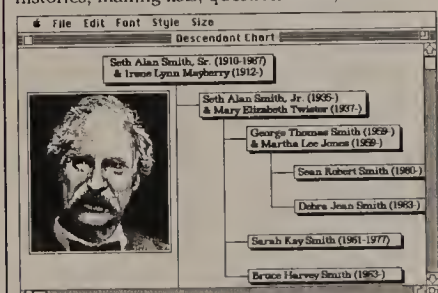
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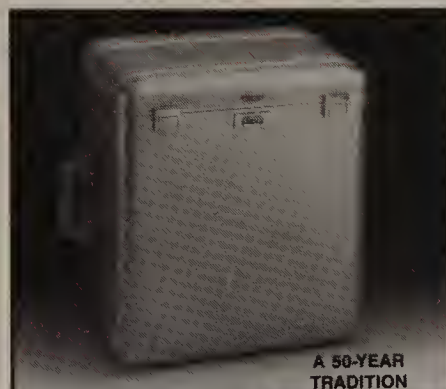
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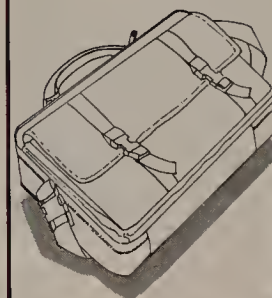
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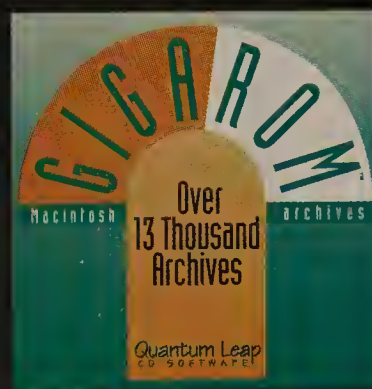
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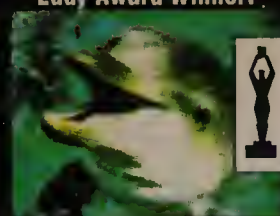
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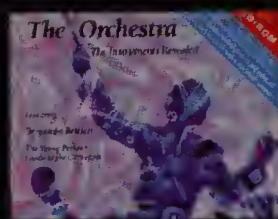
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Best-Sellers

JUNE 1992

Months on chart
▼ Last month
▼ This month

Business Software

76	2	1	Microsoft Excel <i>Microsoft Corporation</i>
85	1	2	Microsoft Word <i>Microsoft Corporation</i>
7	4	3	Microsoft Office <i>Microsoft Corporation</i>
23	12	4	Quicken <i>Intuit</i>
72	5	5	Aldus PageMaker <i>Aldus Corporation</i>
63	6	6	Microsoft Works <i>Microsoft Corporation</i>
6	14	7	Aldus Persuasion <i>Aldus Corporation</i>
6	11	8	MacDraw Pro <i>Claris Corporation</i>
26	3	9	Adobe Illustrator <i>Adobe Systems</i>
61	13	10	MacDraw II <i>Claris Corporation</i>
1	—	11	WordPerfect Office <i>WordPerfect Corporation</i>
37	8	12	WordPerfect for the Macintosh <i>WordPerfect Corporation</i>
37	7	13	FileMaker Pro <i>Claris Corporation</i>
18	9	14	Aldus FreeHand <i>Aldus Corporation</i>
61	10	15	MacWrite II <i>Claris Corporation</i>

Education Software

38	2	1	Where in the World Is Carmen Sandiego? <i>Broderbund Software</i>
19	1	2	Where in Time Is Carmen Sandiego? <i>Broderbund Software</i>
24	4	3	Where in the USA Is Carmen Sandiego? <i>Broderbund Software</i>
52	3	4	Reader Rabbit <i>The Learning Company</i>
63	5	5	Math Blaster <i>Davidson & Associates</i>

Months on chart
▼ Last month
▼ This month

Entertainment Software

25	2	1	Tetris <i>Spectrum HoloByte</i>
50	1	2	Microsoft Flight Simulator <i>Microsoft Corporation</i>
29	3	3	SimCity <i>Maxis</i>
15	4	4	SimEarth <i>Maxis</i>
28	—	5	Falcon <i>Spectrum HoloByte</i>

Network/Data Communications

31	1	1	PhoneNet <i>Farallon Computing</i>
54	5	2	AppleShare <i>Apple Computer</i>
17	3	3	MacLink Plus <i>DataViz</i>
10	—	4	SmartCom II <i>Hayes Microcomputer Products</i>
64	2	5	TOPS <i>Sitka Corporation</i>

Add-In Boards

14	1	1	Macintosh IIsi NuBus Adapter Card <i>Apple Computer</i>
15	5	2	Pivot <i>Radius</i>
18	3	3	Macintosh Display Card 8•24 <i>Apple Computer</i>
4	—	4	Macintosh IIfx Logic Board Upgrade <i>Apple Computer</i>
5	2	5	MacCon+ 30i Ethernet Card <i>Asanté Technologies</i>

Months on chart
▼ Last month
▼ This month

Utility Software

13	1	1	After Dark <i>Berkeley Systems</i>
3	—	2	More After Dark <i>Berkeley Systems</i>
24	2	3	SAM <i>Symantec Corporation</i>
14	5	4	Virex <i>Microcom</i>
17	—	5	Adobe Type Manager <i>Adobe Systems</i>

The AmCoEx Index of Used Mac Prices

Machine/RAM/ Hard Drive	Average Sale Price	Monthly Change
Mac Plus/1MB/none	\$450	0
Mac Plus/2MB/20MB	\$700	-25
Mac SE/2MB/20MB	\$825	-25
Mac Portable/1MB/40MB	\$1300	0
Mac Classic/2MB/40MB	\$800	-25
Mac SE/30/2MB/40MB	\$1800	+50
Mac LC/2MB/40MB	\$1100	0
Mac II/4MB/40MB	\$1725	-25
Mac IIsi/3MB/40MB	\$1900	+75
Mac IICx/4MB/80MB	\$2300	+200
Mac IIfx/4MB/80MB	\$2900	+50
Mac IIfx/4MB/80MB	\$4200	0
Apple 12-inch B&W display/board	\$250	-25
Apple 13-inch RGB display/board	\$625	0
LaserWriter Plus	\$1100	-50
LaserWriter IINT	\$1800	0

Index provided by the American Computer Exchange of Atlanta, Georgia. It reflects sales during the week of March 20. Configurations include keyboard and exclude monitor and display board for noncompact models.

Source: Exclusive Audits & Surveys research from more than 250 Macintosh retailers and selected mail-order vendors. Covers sales during February 1992.

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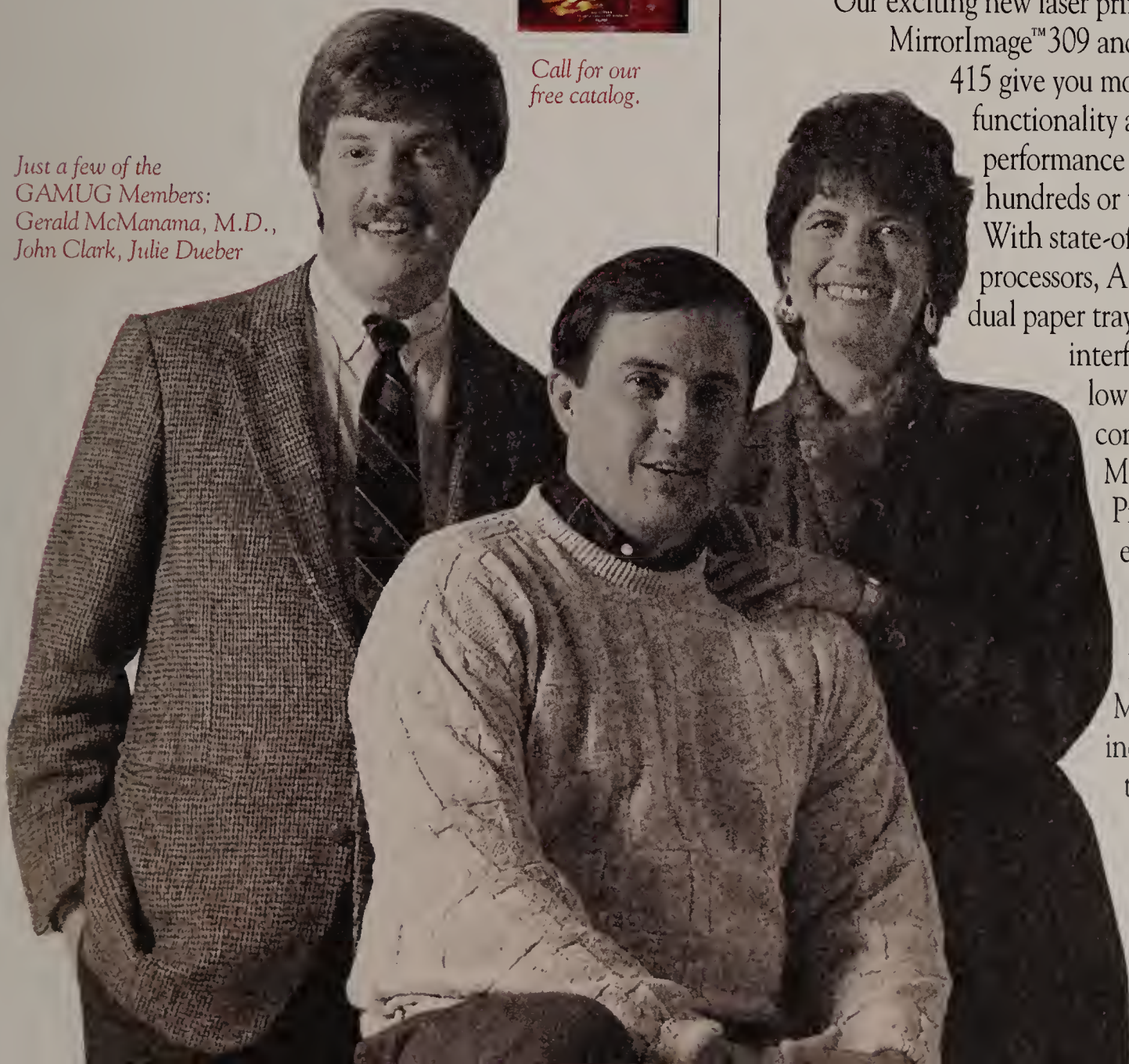
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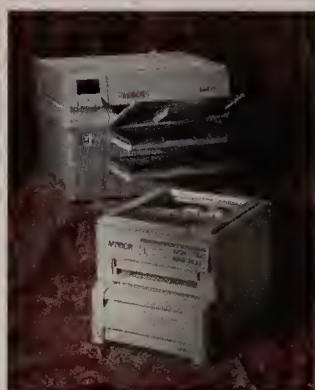
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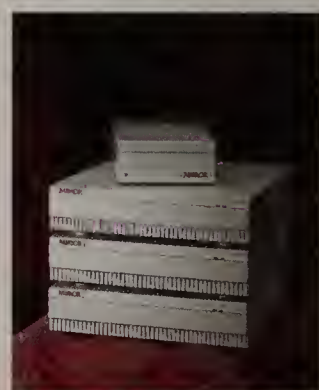
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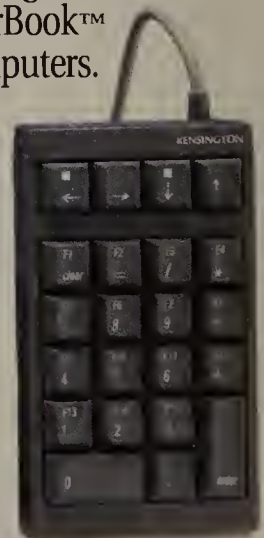
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And the story doesn't end here.

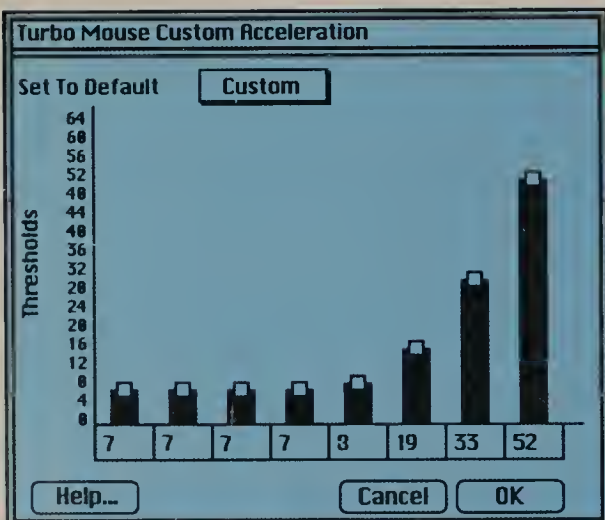
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